Abstract

Michael Overfield. SEARCH FOR *ADVENTURE*. (Under the direction of Dr. Lawrence E. Babits) Department of History, July 2002.

This thesis reports on an historical and archaeological search for underwater anomalies that might identify the ship *Adventure*. *Adventure* was one of two pirate vessels under the command of Edward Thache, that "run a-ground and wrecked" at Topsail Inlet, North Carolina, during the first week of June 1718. When Thache and his four ships attempted to enter Topsail Inlet, three vessels entered with little difficulty. Thache's flagship, *Queen Anne's Revenge (QAR)*, ran onto a sand bar outside the inlet's entrance. *Adventure* went to assist Thache by pulling *QAR* off the bar. While making her way to *QAR, Adventure* ran aground and wrecked.

A multi-disciplinary approach incorporating historical, geological, and archaeological methods will be used to investigate *Adventure's* sinking. Depositions by David Harriot and Ignatius Pell given at the trial of Major Stede Bonnet were analyzed and evaluated in an attempt to narrow the search area within Beaufort Inlet. Historical maps were reviewed, digitized, and overlaid on a current NOAA chart to determine the inlet's movement over the past 284 years. Based upon information derived from maps, the primary search area was identified.

This thesis examines the early history of colonial Beaufort, North Carolina, the impacts of the Navigation Acts on North Carolina, and the attraction of pirates to this struggling colony. An overview of eighteenth-century sloop construction and a comparative analysis of material culture found on the *Queen Anne's Revenge* and the *Whydah Galley* are included.

The wrecking process in a dynamic environment was also examined. The rough wrecking and rapid inclusion into the inlet's sandy sediment, *Adventure* may have been protected from destructive forces that act upon wrecks exposed for any time. The search involved both a magnetometer and side-scan sonar to provide electronic data for assessing the potential for *Adventure*'s discovery. Although the investigation did not find the remains of *Adventure*, the survey has identified features associated with the wrecking process *Adventure* may have undergone.

Adventure would represent one of the oldest wrecks and the first confirmed pirate vessel discovered in North Carolina. Although the *Adventure* wreck site is expected to be scattered, discovery of the smallest remains may provide archaeologists and historians with a glimpse into the economy, society, and culture that operated the vessel. The search for *Adventure* constitutes an important element in gaining a greater understanding of the life of pirates and man's past.

SEARCH FOR *ADVENTURE*

A Thesis
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Chapter One

A Sanctuary for Pirates

Between the hours of midnight and 1a.m. on 14 September 1718, the stillness of the night was broken as a small pirogue glided silently into a dock three miles above John Chester's landing on the Pamlico River. On board the small craft were Richard Stiles, James Blake, James White, Thomas Gates, and their boss Captain Edward Thache. The pirogue carried a cargo of "three or four caggs of Sweet meats, some Loaf sugar, and a bagg of chocolate" intended as a gift for their expectant host and his master (Saunders 1886:341).

The host, Tobias Knight, was colonial secretary, collector of customs, and acting chief justice of North Carolina; his master was Governor Charles Eden. Knight warmly greeted his midnight visitors and entertained them until one hour before daybreak. The gifts were placed in a barn and covered with fodder (Saunders 1886:342), evidently to prevent discovery. It may seem odd for a rendezvous between friends to take place in the middle of the night, unless of course, the men were well known in the area and wanted to conceal their meeting from inquisitive eyes. The midnight meeting prevented rumors and insured the secrecy of an arrangement between two powerful men.

Edward Thache was better known by his alias, Blackbeard, the pirate. Six months later, Thache was dead, his crew tried and hung. Tobias Knight had been apprehended and accused of conspiring with pirates. The story of Tobias Knight and Edward Thache was repeated many times throughout the isolated colonies in North America and the West Indies. The governor of New York, Benjamin Fletcher, and five members of his council were dismissed from public office for dealing with pirates (Lee 1974:68) as was William Markham, lieutenant governor of Pennsylvania, who was accused of giving sanctuary to

pirates at 100 pounds per head (Hughson 1971:39).

From the time of Homer, pirates were known as outlaws of the sea. Eighteenth - century pirates were seen by some historians as evolving from the age of privateers (Rediker 1987:259;Karraker 1953:227;Lee 1992:9). Although the evolution from privateer to pirate could be argued from many points of view, that pirates were experienced seamen aware of growing economic markets and trading patterns is above dispute. Pirates operating during the colonial period took advantage of the growing West Indian trade, followed the mercantile community, attacked vessels, and prospered by trading their illegal goods with communities left out of the mercantile loop.

Pirates required few things to be successful: a favorable anchorage to unload plunder for trade or profit, secluded areas to evade pursuit and repair their ships, and ready access to the ocean and prizes. North Carolina provided an ideal environment. Its many isolated inlets and barrier islands, access to Atlantic trade routes and a willing market, combined with a cooperative government, proved a perfect match with pirate requirements. Many factors influenced North Carolina's close relationship with pirates. Examining the economic environment, the Navigation Acts, development of inter-colonial trade, and the relative isolation from and relationships with other British colonies, a clearer picture of North Carolina's motivation will develop.

To understand the economic environment in North Carolina, it is necessary to grasp the basic concepts of mercantilism and the role colonies played. Between 1650 and 1750, most states in Western Europe were heavily influenced by policies known today as mercantilism. As practiced by England, France, Germany, and Spain, mercantilism was a collection of policies designed to keep the states prosperous through internal regulations (Lipson 1934:8-12).

Mercantilist policies for each European state varied according to its individual

needs. Spain's territories in the New World provided gold and silver for her treasury. France, under Jean Baptiste Colbert, prohibited export of money, levied high tariffs on foreign manufactures, and gave liberal bounties to encourage French shipping. Germany increased its economic power through internal regulations (Lipson 1934:8-12).

In general, mercantilism included many of the following ideas. Nations believed that economic health could be measured by the amount of precious metal, gold or silver, they possessed (known also as bullionism). The rise of a money economy, and the stimulation produced by the influx of bullion from America, supported the view that hard money was the source of prosperity, prestige, and strength. For a nation to have gold on hand at the end of the fiscal year, it needed to export more than it imported, creating a favorable trade balance. Each nation tried to achieve economic self-sufficiency.

Prevailing mercantilist thought supported the following views: those who founded new industries should be rewarded by the state, thriving agriculture should be carefully encouraged, domestic production reduced imports and provided a base of taxation. Additionally, regulation of commerce would produce a favorable trade balance; tariffs should be high on imported manufactured goods and low on imported raw materials. Mercantilists also believed sea power was necessary to control foreign markets. Colonies could also provide captive markets for manufactured goods and sources of raw material. Above all else, state action was needed to regulate and enforce these policies.

The Dutch dominated European trade in the early seventeenth century. By the 1660's, England had an unfavorable trade balance, purchasing more than it was selling. England modified its economic position through the incorporation of six major principles outlined by Thomas Munn, an English writer on economics (1630) and director in the East India Company (1615). These principles served as England's economic policies for the next century and included:

> English raw materials should be reserved to the cloth industry by prohibiting the export of wool, fuller's earth, pipe clay, and other necessities, especially to Holland. English ships and merchants should not be allowed to supply Dutch competitors with Spanish or Turkish wool. Developing manufacturers should reduce the need for imports and loss of bullion; producing linen, hemp, and flax at home would make England independent of the Baltic.
>
> The Dutch should be ousted from the fisheries and supplanted by the English. Foreign merchants and shipmasters that earned money in England, as importers should be required to spend their earnings on English manufacturers. Goods imported from abroad should come either in English ships or those of the country producing the goods (Kammen 1970:6).

In the mercantilists' worldview, colonies existed to assist the mother country. England's colonies contributed to a favorable trade balance through three primary ways. The colonies were expected to purchase finished and manufactured goods from England, directing a flow of money back to England. The colonies were expected to supply England with products, such as naval stores, so England would no longer have to purchase them from other countries, and keeping money in its own treasury. Finally, colonies would supply staples, such as tobacco, rice, and sugar, in such large quantities that England could re-export these items to other countries. Contributions made by the colonies to England would create a positive trade balance and build England's treasury while draining other countries of money (Lipson 1934:154-155).

In 1660, England had two Chesapeake Bay colonies, five New England colonies, and smaller Caribbean dependencies desperately seeking economic viability. The colonies needed to establish stable export products to purchase textiles, metal hardware and finished manufactured goods. Virginia, Maryland, Barbados, and Jamaica produced and exported commodities such as tobacco, sugar, cotton, cocoa, ginger, and dye woods. In return, England supplied clothing, household furniture, provisions, iron and manufactured goods (Lipson 1934:157), along with capital and credit, labor, vessels, and

naval protection. The second group of colonies, more particularly New England, produced cattle, corn, a few masts and furs. "By tillage, pasture, fishing, manufactures and trade they to all intents and purposes imitate Old England" (Lipson 1934:157). The New England colonies struggled from a lack of rich farmlands. The colonies were limited to exporting fish, lumber, and furs to England (McManis 1975:110). With an abundant supply of timber and naval stores, New England turned to shipbuilding and trade with other colonies. Caribbean demands for lumber, staves, fish, beef, pork, wheat, and corn helped establish and expand New England's commerce, shipping, and industry (Steele 1986:61). New England traded timber to Spain and Portugal, invading the monopoly of the Baltic states, placing New England among the colonies profitable to the mother country (Lipson 1934:158). Ships built in New England were sold, along with their cargoes, throughout Europe. The shipbuilding industry provided New England with a product that could be used and sold, allowing the colonists to participate in the mercantile community.

Inter-colonial trade developed rapidly between Massachusetts, New Amsterdam (later New York), and Virginia after 1631 (Johnson 1915:137). Coastal trading centers with good harbors and larger populations, such as Boston and New York, acted as central places in the transportation network, sending and receiving goods from foreign shores and smaller intermediate coastal settlements. Merchants at these centers acted as middlemen between relatively isolated farmers, fishermen, trappers, or laborers of the colonies, and the manufacturing centers of Europe. From the West Indies, New England colonists received rum and molasses along with wine and salt from southern Europe (Dunn 1972:210).

Virginia and Maryland, located in warmer climates with favorable soil conditions, created a different economic environment from the northern colonies. The abundant

supply of tobacco allowed planters and merchants on both sides of the Atlantic to prosper. Tobacco certainly earned its name "the golden leaf," during the seventeenth and eighteenth century. The tobacco trade allowed foreign ships to bring Portuguese port and sherry, Lisbon salt, Seville oranges, citrons, lemons, figs, and vinegar into the Chesapeake (Middleton 1953:195).

Dutch ships did a thriving business in the English West Indies. The Dutch were ready and willing to act as tobacco distributors for the continental colonies (Harper 1939:244). To block out Dutch merchants and insure England was the main beneficiary of its own empire, Parliament adopted a series of Navigation Acts. The first of these acts, the Navigation Act of 1660, had five points directly affecting the colonists. The Act excluded foreign vessels from carrying trade goods into colonial ports, and established bounties for certain colonial goods. The enumerated goods (goods of special value) included furs, masts, tobacco, pitch, tar, resin, hemp, corn or grain, raisins, figs, prunes, olive oils, potashes, foreign salt, and all Russian and Turkish goods (Harper 1939:53). The Act also required these goods to be exported only to England or Ireland or an English possession (Davis 1962:307). Most goods from other countries were to be brought to England or its possessions only in English ships, with masters and three-quarters of the crews English or in ships of the producing country only from their places of origin. The coasting trade was reserved for English-owned ships with masters and three-quarters of the crews English. With this act in place, the Dutch could no longer bring in the main products of Norway, the Baltic, or the Mediterranean nor could they participate in colonial trade or in the importation of goods from outside Europe effectively ending Dutch trade domination.

The Navigation Act of 1660 was followed by the Staple Act of 1663. This act was intended to tighten loopholes within the policies governing trade. The Staple Act called

for "No Commodity of the Growth, Production, or Manufacture of Europe, shall be imported into any...colony...but what shall be bone fide, and without Fraud, laden and shipped in England" (Kammen 1970:24), creating a monopoly on colonial imports with England controlling the prices.

The Act of 1673 particularly focused upon trade carried on by the New England colonies, considered by England as the least valuable of its possessions. The Act imposed duties on enumerated goods when shipped from one plantation to another. Duties imposed by this act meant that bonds were due at the time of shipping any colonial product to another colony or back to England. Posting a bond forced the colonists to either have more ready cash on hand or have an English merchant willing to put up the money for them.

The combined effect of the Navigation Acts not only blocked out the Dutch traders and caused an escalation in prices on European goods in the colonies, but allowed the toleration of pirates in America. Colonists could neither buy nor sell unless from England, at prices set by English merchants. As stated by L. Gatford, a writer in the late seventeenth century, "When the Dutch traded thither the planters bought shoes at twelve pounds of tobacco; since they were prohibited the English made them pay fifty pounds of tobacco for the like" (Lipson 1934:174). Colonists were willing to tolerate pirates, who sold their goods below market value, offering the colonists an increase in purchasing power.

Expansion of England's holdings in the New World was the next natural progression for colonial entrepreneurs seeking their fortunes. Sir William Berkeley, governor of Virginia, saw that territory lying south of Virginia and north of Spanish Florida could produce substantial benefits for England. Carolina's warm climate and fertile soil offered the potential for another plantation colony that would produce valuable

commodities, such as sugar and tobacco. By encouraging settlement in this area, Berkeley hoped to spark rapid growth and capitalize on the new plantation colony for himself and his partners. A new settlement in this area would also provide England an opportunity to prevent the Spanish from gaining a larger foothold along the Atlantic Coast.

In the New World, England and Spain were bound to come in conflict. England had participated little in the process of exploration yet insisted that its occupation provided a legitimate claim; Spain declared that discovery provided its claim. The Spanish desired to monopolize colonial trade and also wished to prevent England from establishing a stronger foothold. On March 24 1663, Charles II granted a charter territory from Albemarle Sound to the Spanish settlement at St. Augustine to Berkeley and his partners (later known as the lords proprietors).

Unlike the New England colonies and the West Indies, (North) Carolina[1] was peopled by colonists moving into the area from existing English colonies. Expansion of English settlers from Virginia into the Albemarle Sound represented the first permanent settlement in the colony. The lords proprietors incorporated the Albemarle Sound settlement as the county of Albemarle in the province of Carolina. Settlement was encouraged, but the lack of adequate ports capable of handling ships between the colony and England attracted few settlers.

An expedition was sent to survey south of the Albemarle in 1667. Headed by Captain William Sayle, a more promising area was found at Oyster Point, between the Ashley and Cooper rivers. This new settlement captivated the lords proprietors' interest, and by 1670, they began to shift their efforts to the newly established settlement called

[1] Although North Carolina and South Carolina were not divided into separate colonies until 1710, the separation will be used for clarity in this text.

Charles Town. There was an abundant supply of oak and pine trees (Ramsey 1858:113), that could be sold in the West Indies and provide naval stores for England. Furs from deer, foxes, raccoons, bears, beaver, and wild cats would meet a ready market in Europe. Above all, Charles Town offered a harbor capable of handling ships to and from England.

Devoid of good roads and relatively isolated, North Carolina continued to struggle. The lack of a deep water port caused many North Carolina colonists to haul their produce overland to the Virginia ports, increasing costs and reducing profits. Only half the colony's trade went through its own ports (Ekirch 1981:16). Prior to 1679, tobacco shipped through Virginia ports was charged excessive entry and clearance fees. The prohibition on importing North Carolina tobacco into Virginia stifled North Carolina's participation in the tightly controlled monopoly England created with the Navigation Acts.

North Carolina's experience with piracy during the eighteenth century was not unlike that of other English colonies of an earlier date (Lee 1992:71). The reluctance of the lords proprietors to invest in a province that was not yielding a profit, and not a crown colony, being offered men-of-war to police their waterways, North Carolina was isolated, both physically and financially from the other colonies. The habit of dealing with pirates by North Carolinians reached the upper levels of North Carolina's government. Offering pardons and prize condemnations, Governor Eden and his secretary and collector of customs, Tobias Knight received substantial dividends for their work (Saunders 1886:322).

Another serious obstacle to North Carolina's growth and prosperity was Virginia's hostility. From its superior position as a crown colony, Virginia looked on Carolina with disdain. Carolina had been created out of Virginia and populated largely at its expense. Border disputes were not settled until 1728. Carolina also offered

competition to Virginia's staple product, tobacco. Beginning in 1679, the Virginia assembly declared that Carolina produced an inferior grade of tobacco leaf, and when sent to England by way of Virginia, greatly injured the reputation of Virginia tobacco. Virginia's refusal to ship Carolina tobacco retarded growth of the Albemarle settlement (Middleton 1953:114-115).

Beaufort, North Carolina, exemplifies the struggle to expand the Albemarle settlement. As soon as settlers moved into the Core Sound area, its potential as a port was recognized. On 20 December 1707, Farnifould Green obtained a patent for 780 acres of land, that included the future site of Beaufort (Davis 1982:73). The grant included the south end of the peninsula between the North and Newport rivers, two miles north of the gap where Topsail Inlet provides a passageway through the Outer Banks. Piercing the outer banks south of Beaufort, Topsail Inlet (now called Beaufort Inlet) provided the seaport town with access to the open sea. With a low water depth of twelve feet and approximately four additional feet during high tide, Topsail Inlet was the most navigable of any inlet along North Carolina's coast (Crittenden 1936:3-4). Between Topsail Inlet and the town lay a body of water providing Beaufort with "a safe and Commodious Harbor" (Clark 1895:684). The water depth in this harbor ranged from five to seven fathoms (Harriss 1960:65).

The Tuscarora War of 1711-1713 delayed establishment of a town at Topsail Inlet. Though few in number, the local Native American inhabitants were active participants in the Tuscarora War. The native Carolinians included three tribes, the Coree, the Meherrin, and the Tuscarora. These three groups, from the onset of English colonization in (North) Carolina, had been cheated and taken advantage of. "When settlers acquired land by treaty, purchase and deeds, they frequently cheated the natives" (Lee 1963:21). Relations between white settlers and natives were strained at best. The

natives complained that settlers encroached upon their land and often farmed so close to their water supplies that they blocked access. As more colonists settled, friction between colonists and natives escalated. In 1710, the final straw occurred with the establishment of New Bern. More than four hundred settlers arrived in just a few months (Harriss 1960:68; Lee 1963:23). The Coree, Meherrin, and Tuscarora acted to drive the settlers out. On 22 September 1711, they attacked settlers along the Neuse, Trent, and Pamlico rivers and around Core Sound. Fighting continued for nearly two years; the uprising was only put down with assistance from South Carolina. With relative peace restored, settlement resumed (Lee 1963:27).

Green sold his tract to Robert Turner in 1713. That fall, permission was obtained to lay out a town named Beaufort at the site (Davis 1982:73). The name Beaufort came from Henry, Duke of Beaufort, one of the lords proprietors. Colonial Beaufort was located on the North Carolina mainland, separated from the open ocean by Core and Bogue sounds. On 2 October 1713, Turner hired Richard Graves, deputy surveyor, to lay out the town (Figure 1.1). Streets were named after the lords proprietors, the queen of England, and others of prominence. Lots were provided for a church, townhouse, and marketplace.

Turner sold twenty-eight lots to fourteen different investors for twenty shillings each, although only eight houses were built. Few if any investors made their homes in Beaufort. By 1714, Turner added a provision that a house not less than twenty feet by fifteen feet must be constructed on each lot within a year of purchase (Davis 1982:74). The best picture of Beaufort in these early years comes from Captain Charles Johnson's *A General History of Pirates*, which describes Beaufort as " a poor village at the upper end of the harbour" (Johnson 1998:68-69).

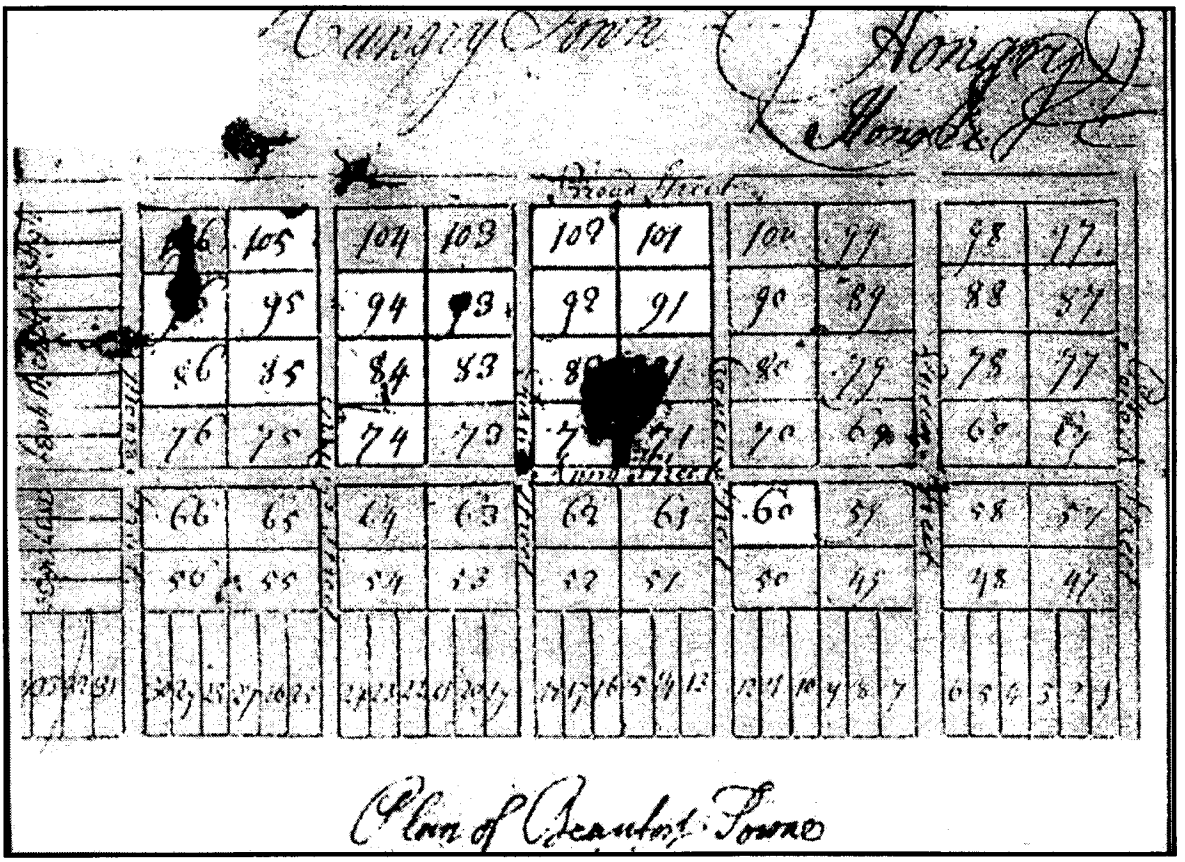

Figure 1.1. *Plan of Beaufort Town, 1713.* Richard Graves engraving (Graves 1713).

Although a poor village, an abundance of natural resources flourished off the inlet's entrance. In 1714, Captain John Records made a note of "whaleing on the Sea Coast of port Beaufort" (Saunders 1886:460). By 1715, the lords proprietors saw an opportunity for money and opened the waters of North Carolina to "any New England men and others to catch Whales, Sturgeon, or any other Royal Fish"(Saunders 1886:175-176). The lords proprietors imposed a ten percent tax on fish caught (Saunders 1886:490). Beaufort changed hands a number of times during the next decade (CCDB 1713-1780:42-44), and failed to become a major port. For ports to operate successfully, access to land products is essential. Waterways from Beaufort did not extend into the

interior or make convenient connections to rivers that did.

The Beaufort area benefited from pirate visits. Topsail Inlet provided access to the Atlantic and was relatively close to the richer colony of South Carolina and its port of Charles Town. The limited number of inhabitants, the town's virtual isolation from the rest of the world, and shifting sand banks within the inlet provided pirates an ideal location to hide, careen their ships and participate in marginal trade.

While Beaufort stagnated, Charles Town continued to grow. With the introduction of rice by Thomas Smith in 1693, South Carolina found its own cash crop. Export products from South Carolina are described by merchant traders as "Rice, skins, pitch, Tar, and other Naval Stores & Commoditys" (Saunders 1886:196). Rice was shipped to England and re-exported. While the economic system worked for South Carolina, the northern settlement was slow to grow.

The economic climate of the English colonies in 1716 is best illustrated in a letter addressed to the Council of Trade from Secretary James Stanhope, written on February 23, 1715(1716):

> All our Sugar Collonys are Islands, and produce few things that England does, for that reason, and because they want manufactures, they are incapable of subsisting by themselves; and being under a necessity of being supplyed from abroad, it is much the interest of Brittain to have it done from thence.
>
> Virginia and Maryland are the Tobacco Collonys, their trade being under some discouragements of late, they plant less Tobacco, and more provisions, and are improving in some manufactures. They may be capable in time of subsisting without any supplys from Brittain.
>
> Our other Collonys on the continent of America are Carolina, Pensilvania, the Jerseys, New York and New England. These vast tracts of Land, and several of them, especially New England are much more populous than the other more advantageous Collonys. They produce most of the same things that England does, and are capable of subsisting without any dependence on it.
>
> They supply our Sugar Collonys with provisions and some

> manufactures, which England formally had the advantage of furnishing them. In return for which goods they carry back Sugar and other produce of the sugar collonys, which is consumed in the said Plantations on the Continent; and thereby the benifit that such sugar and other goods would bring us by their importation and exportation again in Forreign Trade is likewise lost (Saunders 1886:156).

While the Navigation Acts inhibited colonial trade, it was not completely stifled. "The larger part of Boston's trade between 1660 and 1675 was carried on illegally" (WPA 1985:32). Smuggling was considered a legitimate occupation in the colonies (Hughson 1894:53), and the citizens in most seventeenth and early eighteenth century American ports welcomed many smugglers and pirates. It was reported that:

> In Massachusetts, pirates were always sure of a welcome, and in Boston they were almost given the freedom of the city... When in 1684, Proclamations against pirates were put up in the streets, the citizens of Boston tore them down (Pringle 1953:128).

American vessels found it profitable to smuggle by going from English plantations to foreign colonies in America. The use of small vessels minimized losses in case of capture. A favored meeting place was the sheltered waters of Albemarle and Pamlico Sounds, where boats from the eastern shore of Virginia came down out of sight of His Majesty's frigates cruising outside Chesapeake Bay (Harper 1939:257).

New England, Pennsylvania, and North Carolina were colonies where smugglers and pirates were at least tolerated, sometimes welcomed, and perhaps needed to obtain trade items. As pointed out in Hugh Lefler's *North Carolina: History of a Southern State*:

> It should be borne in mind that the attitude toward these questionable and illegal practices was different then from which developed later. English trade laws were extremely unpopular in the colonies, and it was smart, proper, and profitable to evade them. Hence, smuggling prevailed almost everywhere. Piracy was not considered an

> unmitigated evil and many of the pirates were regarded as respectable men and were sheltered and protected by the people. After all, they brought in many desirable articles which they usually sold at reasonable prices; they also helped to keep out French and Spanish vessels (Lefler 1954:62-63).

New England ships acting as carriers for other colonies brought tobacco, sugar and other enumerated goods and sold them to fishing ships in Newfoundland; in return colonial markets were furnished with European commodities by the fishing fleets (Lipson 1934:176). New England also traded directly with European countries, exchanging colonial products for manufactured goods (Lipson 1934:176). It was only when merchants were preyed upon by the pirates and relief from their situation could come only from outside of the colony that piracy was seriously addressed.

Piracy along the North Carolina coast expanded for a variety of reasons. North Carolina, impeded by its spatial and legislated isolation from other colonies, struggled to participate in the mercantile system. Piracy was not an impediment to the development of North Carolina during the early colonial period and often provided essential goods to the colonists. Pirates looked upon the settlements as communities with which they could carry on a profitable trade and come and go among the people without fear of hindrance (Hughson 1971:13). Before piracy emerged as a problem, North Carolina had to develop to a point where trade was compromised. With little maritime commerce to prey upon, pirates did not threaten the few settlers' livelihood. Pirates could bring stolen goods through the inland passage, disappear from those giving chase, sell their loot, and then return to plundering with relative ease because they provided European products at the lowest prices.

Chapter Two

Historical Account of Edward Thache and the Loss of *Adventure*

The legend of Blackbeard is filled with fictional and romanticized accounts of the pirate's life. In separating fabrications from facts, Edward Thache can be seen as overconfident in his abilities, seeking power and influence, and in the end, he paid the price with his life. Thache conveyed an image that would often strike the fear in men.

> His beard was black, which he suffered to grow of an extravagant length; as to breadth it came up to his eyes. He was accustomed to twist it with ribbons, in small tails, after the manner of our ramilies wigs, and turn them about his ears. In time of action, he wore a sling over his shoulders with three brace of pistols hanging in holsters like bandaliers, and struck lighted matches under his hat, which, appearing on each side of his face, his eyes naturally looking fierce and wild, made him altogether such a figure, that imagination cannot form an idea of a fury, from hell, to look more frightful (Johnson 1998:60).

Thache was one of the most notorious pirates of his day. The reason for this may be the mystery surrounding his origins, the dramatic way he lived, or his demise at the hands of Lt. Robert Maynard. Most of what we know of Edward Thache, including variations on the spelling of his name (Tach, Thatch, Teach(e))[2], alias Blackbeard, comes from pirate biographer Captain Charles Johnson and his book *A General History of the Robberies and murders of the most notorious Pyrates, and also their policies, discipline and government, from the first rise and settlements in the Island of Providence, in 1717, to the present year 1724*, commonly shortened to *A General History of Pyrates*. Johnson published his work in 1724 and has been cited by historians as the authoritative text on early eighteenth-century piracy. Although many details described by Johnson are

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[2] In the processing of sugar into molasses (needed to make rum) Peter Oxholm designed a furnace, known as a "Jamaica Train." In the train, one fire, lit and maintained under the smallest and hottest pot in the boiling bench, the Teache, was used to heat the entire battery. Perhaps Blackbeard used this term to hide his real identity. (Knight 2000:38)

supported by other primary sources, *A General History of Pyrates* should be read with a critical eye. Many of the stories published by Johnson have been substantiated; others appear to be fictitious, although inspired by factual events (Cordingly in Johnson 1998:X). Little can be learned of the childhood and youth of even the best-known pirates. Pirates rarely wrote about themselves and their families (Lee 1974:3). What we do know is what was printed in letters and court trials of the pirates who served with Thache. The life of Edward Thache can be followed for a brief fifteen-month period based upon available sources. To trace the history of Edward Thache, a variety of primary sources will be used in conjunction with Johnson's *A General History of Pyrates* to present an accurate portrayal of events surrounding Blackbeard's life. Edward Thache's life as a known pirate lasted from late 1717 until 22 November 1718.

The mystery surrounding Thache's early life is not surprising. Johnson suggested that Thache was born in Bristol (Johnson 1998:46). There, Thache may have been influenced by Bristol's maritime heritage and traditions, its reliance on sea trade and privateering. One voyage that may have influenced Thache through its riches, adventure and the rapid rise of its captain to wealth and influence left Bristol on 2 August 1708, commanded by Woodes Rogers, a successful naval officer and navigator, who would later play a major role in eradicating piracy. Two ships, the *Duke* and the *Duchess* circumnavigated the world on a plundering expedition for the crown. They returned to Bristol 14 October 1711 with a net profit between £ 200,000 and £ 800,000 (Lee 1974:7).

Thache's pirate career starts with his employment with Captain Benjamin Hornigold during the earlypart of 1717. According to Johnson, Thache served as a privateer out of Jamaica (Johnson 1998:46) with Captain Hornigold during Queen Anne's War. It would not have been unusual for a Bristol sailor to find his way to the West Indies. The sugar islands were the most profitable English colonies and precariously

close to Spanish North America, and the Spanish, French, and Dutch islands. At this latitude, pirates would find cargoes of provisions, clothing, naval stores, wine, rum, sugar, and at times, gold and silver.

Privateering became very profitable for the owners and crews of English vessels during Queen Anne's War (War of Spanish Succession 1702-1713). An act of 1708 allowed owners and crews of privateers to share in the plunder of enemy vessels without diverting a share to the English Crown (Lydon 1970:82-84). When peace was announced in 1714, many seamen abruptly found themselves unemployed with few jobs available. Rediker simplistically points to this sudden unemployment of merchantmen and to the cruel treatment of mariners aboard Royal Navy ships which led men to work for themselves and rebel against authority as the cause for the dramatic increase in piracy following Queen Anne's War (Rediker 1987:265). On board a Royal Navy vessel, the hours were long, the pay was low, and the work was hard. It could be argued that it was the freedom to be one's own man, not having to answer to king nor country that led men to the pirate lifestyle. It is probable that the taste for money left from profits made privateering motivated more than a few sailors to turn toward piracy, as piracy paid considerably more when compared to the Royal Navy or cargo vessels. One of the best statements of why men went "a-pirating" was made by the infamous Bartholomew Roberts, "In an honest service there is thin Commons, low wages and hard Labour; in this Plenty and Satiety, Pleasure and Ease. Liberty and Power, and who would not balance Creditor on this Side when all the Hazard that is run for it, at worst, is only a forelock or two at choaking" (Rankin 1969:23).

The account of Blackbeard picks up in late 1717, when Thache and Hornigold sailed from New Providence. The largest of the Bahama Islands, New Providence was ideally suited as the pirates base of operations. The English possessed the Bahama Islands

until 1700, when French and Spaniards from Petite Guavas invaded, plundered, and destroyed the settlements. With government vanquished, pirates moved in. By September 1716, piracy had grown to such a degree that Whitehall ordered a naval force stationed in the colonies for the first time. Jamaica received five ships, the forty-gun *Adventure*, *Diamond*, *Ludlow Castle*, the twenty-gun *Winchelsea*, and the sloop *Swift*. Barbados had the thirty-gun *Scarborough*, the Leeward Islands the six-gun *Seaford* and *Tryal*; Virginia had the twenty-gun *Lyme* and the forty-gun *Pearl*; New York had the thirty-gun *Phoenix*, and New England had the twenty-gun *Squirrel* (Johnson 1998:12-13). Although this would appear to be an adequate force to suppress piracy, most vessels served as escorts, protecting ships transporting valuable cargoes of sugar and tobacco, commonly a year-long round trip, (Davis 1962:281) and doing little to curb piracy.

Sailing between the West Indies and the Atlantic coast of America, Hornigold and Thache captured and plundered several merchant ships. (Lee 1974:14). In the Virginia trial of William Howard, a quartermaster for Thache at this time described the taking of these vessels:

> ...on or about the 29th day of Sept'r in the Year Afforesaid in an Hostile manner with force and Arms on the high Seas near Cape Charles in this Colony within the Jurisdiction of the Admiralty of this Court attack & force a Sloop Calld the Betty of Virginia... and there Rob and plunder of Certain Pipes of Medera Wine and other Goods and Merchandizes... on or about the 22d of Octor in the year aforesaid in the Bay of Delaware in America...Pyratically take Seize and Rob the Sloop Robert of Philadelphia and the Ship Good Intent of Dublin bound for Philadelphia (Palmer 1875:96).

In November 1717, the *Boston News-Letter* published news from Philadelphia dated 24 October 1717, stating that Blackbeard had taken a ship commanded by a Captain Codd of Liverpool and Dublin:

> I was taken about 12 days since off our Capes by a pirate sloop called the

> Revenge, of 12 guns 150 Men, Commanded by Teach, who formally sail'd mate out of this port... The Pirates told the prisoners that they expected a Consort ship of 30 Guns, and then they would go up to Philadelphia... On board the Pirate Sloop is Major Bennet [sic], but has no Command, he walks about in his Morning Gown, and then to his Books, of which he has a good Library on Board, he was not well of his wounds that he received by attacking of a Spanish Man of War, which kill'd and wounded him 30 or 40 Men. After which putting into Providence, the place of Rendevouze for the Pirates, they put the aforesaid Capt.Teach on board for this Cruise (*Boston News-Letter* 1717).

The consort ship expected by the pirates could have been the *Ranger*, under Hornigold's command.

Hornigold, a privateer during Queen Anne's War, had pursued a brief career as a pirate at the end of the war. Evidence Thache was employed by Hornigold is found in a letter written by another pirate of the day, Stede Bonnet, who, in a letter to Colonel Rhett, Reciever-General of South Carolina and Bonnet's captor prior to his execution, stated:

> I was a prisoner on board Captain Edward Thach (Teach), who, with several of Captain Hornigold's company which he then belonged to, boarded and took my sloop from me at the Island of Providence, confining me with him eleven months (Ramsey 1858:116).

The pirates then headed south, according to Johnson, and returned to the West Indies with cargos of "flour, some gallons of wine, and Madeira" (Johnson 1998:46). About 100 miles out of Martinique (Lawrence 2001:2), Hornigold and Thache captured the French slave ship *Concorde* of Nantes, France, bound for Martinique. Blackbeard, with Hornigold's consent, "went aboard as captain and took a cruize in her" (Johnson 1998:47). Hornigold retired from piracy and took up life as a planter on New Providence. He had made a considerable amount of money from his brief career as a pirate and could now afford to try his hand at planting (Johnson 1998:47). He decided to take advantage of the king's pardon.

Thache took command of *Concorde* and, accompanied by other pirates with no

interest in accepting the king's pardon, mounted forty cannon on board and renamed her the *Queen Anne's Revenge*. According to Johnson's *A General History of Pyrates,* Thache was cruising near the island of St. Vincent when he took the large ship *Great Allen*. A few days later, he reportedly engaged the *Scarborough*. Finding the pirates well armed after exchanging fire for some hours, the *Scarborough* broke off and returned to Barbados (Johnson 1998:47). This may be where Johnson has embellished history. The *Scarborough*'s logbook reveals no such encounter during this time frame (Moore 1996:33).

Woodes Rogers was commissioned captain-general and governor-in-chief of the Bahama Islands on 6 February 1718. Rogers, after his profitable privateering days, formed a stock company with a group of Bristol merchants for the purpose of colonizing the Bahamas and eliminating piracy in the West Indies. By 1718, the lords proprietors of the Bahamas[3] surrendered the civil and military government of the islands to the crown and leased the quitrents and royalties to Rogers and his company for twenty-one years. He left England with four heavily armed warships, the Royal Navy frigates *Rose* and *Milford*, and the sloops *Buck* and *Shark*. He carried with him the king's proclamation, pardoning all pirates if they surrendered before 5 September 1718, and if they took an oath not to return to their former enterprise (Lee 1974:15). Although many pirates surrendered and took full advantage of the king's pardon, others fled to safer ports (Lee 1974:16).

Thache sailed toward Spanish America where he met another pirate sloop of ten guns commanded by Major Stede Bonnet (Johnson 1998:47). Bonnet's letter to Colonel Rhett stated that Thache captured his vessel while employed by Captain Hornigold, so these actions may have taken place prior to Hornigold's acceptance of the king's pardon.

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[3] The lords proprietors of the Bahamas were the same lord proprietors of the Carolinas (Craton 1962:102).

Thache invited Bonnet to sail with him and his crew. After several days, Thache found that Bonnet knew nothing of maritime life. He took Bonnet aboard his own ship offering Bonnet to live at his pleasure aboard the *Queen Anne's Revenge* (Johnson 1998:47). Thache put his second in command, Lt. Richards, in charge of Bonnet's *Revenge,* and in late March 1717, they turned their ships toward Turneffe.

In late March 1717, while taking on fresh water, the pirates saw a sloop approaching ten leagues short of the Bay of Honduras. Aboard the *Revenge*, Lt. Richards was the first to raise his anchor and pursue this vessel with Thache in *Queen Anne's Revenge* not far behind (Lee 1974:32). *Adventure* was an 80-ton sloop under David Harriot involved in the lucrative logwood trade out of Jamaica. Thache made the decision to keep this sloop and added her to his growing flotilla. Thache put *Adventure* under Israel Hands, sailing master of *Queen Anne's Revenge*. Thache now had three ships and a crew of up to four hundred men under his command (Lee 1974:33).

In the western Caribbean, Thache and his crew took a large merchant vessel. The *Protestant Caesar* had successfully fought off an earlier attack by one of Thache's sloops, Bonnet's *Revenge* under Lt. Richards, which provoked the pirates into searching out the vessel so that her captain "...might not brag when he went to New England that he had beat a Pirate..." (*Boston News-Letter* June 1718). While approaching Turneffe, they came across one ship and four sloops. Enroute to the Grand Caymans, on April 9, they took a small turtler, probably for the fresh meat. From the Grand Caymans they headed toward Havana. There they took a small Spanish sloop and turned to the Bahamas, "fishing" the wrecks for Spanish treasure (Johnson 1998:48). The hurricane season was approaching and it was time to head for the Carolina sounds to careen their vessels, divide their booty, and settle in for the coming months.

In May 1718, the flotilla approached Charles Town harbor and dropped anchor.

They were the forty-gun *Queen Anne's Revenge*, commanded by Thache, the ten-gun *Revenge*, commanded by Thache's second in command Lt. Richards, and the eight-gun *Adventure*, commanded by sailing master Israel Hands. The Spanish sloop captured outside Havana accompanied these ships as a tender.

Charles Town, (South) Carolina, with a population of 3,500 (Steele 1986:294), had been devastated by Indian wars only a few years earlier. Without help from its northern neighbors, the port was vulnerable and weak. Even so, Charles Town was the busiest and most important port of the southern colonies (Figure 2.1). Pilot boats escorted ships past the sand banks that encroached upon the harbor entrance.

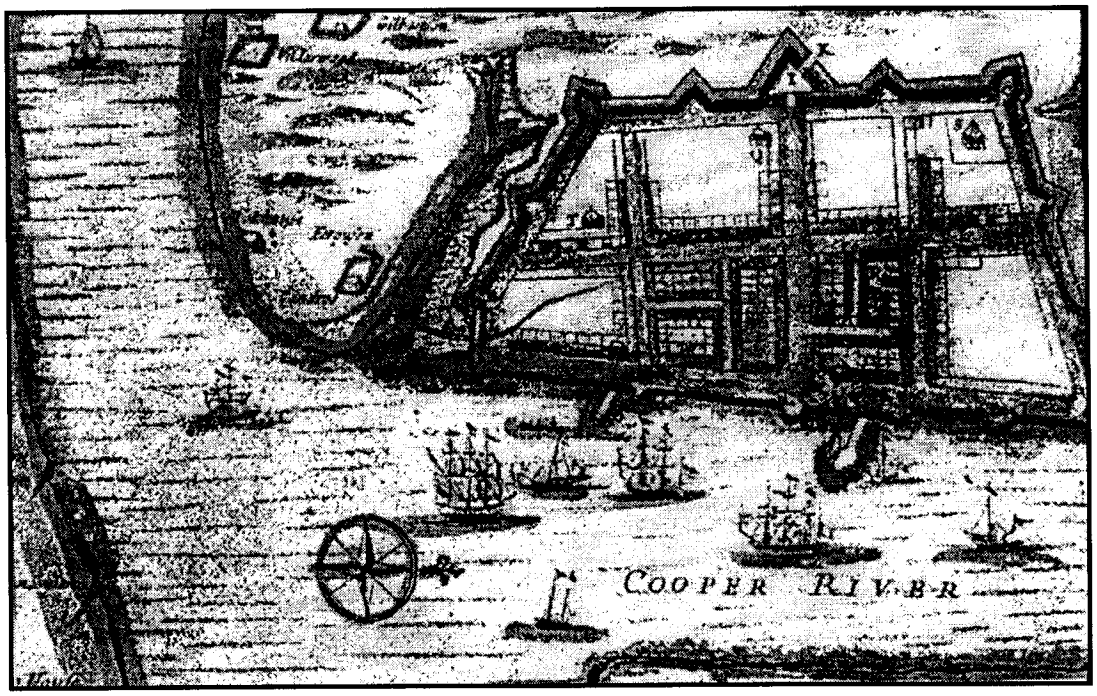

Figure 2.1. Charles Town harbor (Botting 1978:145)

Placing his ships just outside the bar of Charles Town's harbor, Thache effectively blockaded the harbor and began to take ships entering or leaving the harbor.

The first vessel taken was the harbor's pilot boat. The first ship taken was *Crowley,* captained by Robert Marks, departing Charles Town for London carrying prominent Charles Town citizens. Over the next two days, at least eight ships were plundered, and eight ships remaining in the harbor refused to go to sea (Johnson 1998:48). Shipping in Charles Town was brought to a standstill.

Thache interrogated the passengers from the *Crowley* and then had them thrown below under locked hatches (Johnson 1998:48). Blackbeard had an immediate effect on his captives; they believed that they were all soon to die. In need of medical supplies, Thache sent Mr. Marks, master of the *Crowley*, Lt. Richards, and another of his crew into town for these supplies (Johnson 1998:49). The pirates offered to exchange the captured ships and their passengers for medical supplies. If their needs were not met in two days or harm fell upon Lt. Richards, the pirates would "burn the ships that lay before the town and beat it about our ears" (Lee 1974:43). Thache moved his fleet back from the harbor entrance another five to six leagues to await his ransom.

Two days passed without a response, which left Thache furious. The captives begged for another day, which Thache finally granted. The next day, a fishing boat approached the *Queen Anne's Revenge* and informed the pirates that the men Thache sent to Charles Town had been caught up in a sudden squall, and their arrival into Charles Town had been delayed. Thache waited another two days, certain his own men were either captured or killed. Thache swore he would kill not only his prisoners, but also all citizens who might fall into his hands (Johnson 1998:48).

To save their own lives, Thache's prisoners offered to pilot the pirate ships into the harbor. Eight ships (the four pirate vessels and four of the captured vessels) weighed anchor and moved into Charles Town harbor. In full view of the town, the ships caused Charles Town's residents to expect an attack, and pandemonium broke out. Men were

given arms and told to defend the town while " women and children ran about the streets like mad things" (Johnson 1998:49). Just as the boats were approaching the main dock, a small boat reached the pirate fleet; it was Lt. Richards, Mr. Marks, and the other sailor from Thache's crew with the medical supplies (Johnson 1998:49).

The tactics employed by Thache and his crew had reduced an entire city to total submission without firing a single shot. Neither the victims nor the pirates themselves suffered physical injury. The image and reputation of Blackbeard was all that was needed. Thache relieved his hostages of their gold and personal belongings and sent them back to Charles Town. From Samuel Wragg, Thatch took more than £1,500 in gold and silver. The medical supplies were worth between £300 and £400 (Johnson 1998:49). Overall, the pirate take from this episode was worth over £8,000, or $538,480 in contemporary purchasing power (Fischer 1966:4-6).

The next stop for Captain Thache was (North) Carolina. Having a crew of close to four hundred (Moore 1997:31) and not wanting to share out the plunder as was customary, Thache is thought to have devised a plan that would equate to an act of corporate downsizing in today's business world. During the first week of June 1718, three sloops of Thache's flotilla sailed into Old Topsail Inlet (Beaufort Inlet), (North) Carolina, under the cover of darkness to avoid detection and possible capture, for the purpose of careening their vessels (Johnson 1998:49-50). Owing to the shallow water and the considerable draft of *Queen Anne's Revenge*, Thache waited for high tide to negotiate the channel. The following morning's high tide allowed *Queen Anne's Revenge* to proceed. David Herriot, former master of *Adventure,* testified at the trial of Major Stede Bonnet in Charles Town several months after the wrecking at Topsail that:

> ...about six Days after they left the Bar of Charles-Town, they arrived at Topsail-Inlet in (North) Carolina, having then under their Command the Ship *Queen Anne's Revenge,* the Sloop commanded by Richards, this

> Deponent's Sloop, commanded by one Capt. Hands, one of the said Pirate Crew, and a small empty Sloop which they found near the Havana... That the next Morning after they had all got safe into Topsail-Inlet, except Thatch, the said Thatch's ship *Queen Anne's Revenge* run a-ground off of the Bar of Topsail-Inlet, and the said Thatch sent his Quarter-master to Command this Deponent's Sloop to come to his Assistance, but she run a-ground likewise about Gunshot from the said Thatch, before his said Sloop could come to their assistance, and both the said Thatch's Ship and this Deponent's Sloop were wreck'd; and the said Thatch and all the other Sloop's Companies went on board the Revenge, afterwards called the *Royal James*, and on board the other Sloop they found empty off the Havana (Howell 1811:1258).

Harriot continued with:

> ... Twas generally believed the said Thatch run his Vessel a-ground on purpose to break up the Companies, and to secure what Moneys and Effects he had got for himself and such other of them as he had most Value for. That after the said ship and this Deponent's Sloop were so cast away, this Deponent requested the said Thatch to let him have a Boat, and a few Hands, to go to some inhabited Place in (North) Carolina, or to Virginia, there being very few and poor inhabitants in Topsail-Inlet, where they were; and desired the said Thatch to make this deponent some Satisfaction for his said Sloop; Both which said Thatch promised to do. But instead thereof, ordered this Deponent, with about sixteen more, to be put on a small Sandy Hill or Bank, a League distant from the Main; on which Place there was no Inhabitant, nor Provisions. Where this Deponent and the rest remained two Nights and one Day, and expected to perish; for the said Thatch took away their Boat. That said Thatch having taken what Number of Men he thought fit along with him, he set sail from Topsail-Inlet in the small Spanish Sloop, about eight Guns mounted, forty White Men, and sixty Negroes, and left the *Revenge* belonging to Bonnet there... (Howell 1811:1258).

Herriot's deposition was supported by the deposition of Ignatius Pell, a member of Thache's crew at Topsail-Inlet stating, "That all and singular the Matters and Things herin before deposed by the said David Herriot are true" (Howell 1811:1264). Stede Bonnet, the rightful owner of the remaining vessel, *Revenge*, wanted to take his ship and receive his pardon, but he needed papers from Governor Eden. Thache agreed to return

Bonnet's ship, but advised Bonnet to take the ship's longboat through the sounds and rivers to Bath, Eden's home town.

When Bonnet returned a few days later, he discovered *Revenge* at anchor, her crew marooned on a small sandbar. *Revenge* was stripped of all small arms, supplies, and provisions (Johnson 1998:50). Bonnet rescued his crew and sailed off in the scavenged *Revenge*. Since Bonnet left Topsail Inlet with his ship in such a sorry state, it is possible that he attempted salvaging either *Adventure* or *Queen Anne's Revenge* for necessities, but found the vessels in a similar state of wanting or had been rapidly buried by sediments.

Sailing north in the Spanish sloop with sixteen of his closest crewmembers, Thache had one last task to complete before waiting out the winter. Thache went to Bath Town and surrendered to Governor Eden (Johnson 1998:50), who granted a pardon to Thache and his men. They were cleared of their crimes by George I's proclamation (Appendix B) and were starting life on a clean slate (Johnson 1998:51). Thache was now able to live in a small coastal community, immune from prosecution, waiting for a time when he could once again pillage merchant shipping. North Carolina was a pirate utopia. Close to the inter-colonial traffic lanes, the inlets between the sand bars allowed shallow draft pirate vessels to escape or evade pursuit. The inland waters were convenient hideouts; places for cleaning, caulking, and refitting ships for another cruise. Thache now had with him two of the most important documents needed to enter any port in the world. The vice admiralty court in Bath Town cleared the title to *Adventure*, officially placing the vessel in the name of Thache for trading expeditions on the high seas (Williams

1937:101). He also had the king's pardon issued to him by Governor Eden.

Thache did not wait until the end of the hurricane season to begin plying his trade once again. In June 1718, Thache steered a course towards Bermuda, meeting two or three English ships on his way and relieving them of provisions. On this same cruise, two French vessels, one loaded with cocoa and sugar bound for Martinique, were also taken. Thache transferred the cargo aboard his own vessel, sent the crews away on one ship, and returned to Bath Town with the remaining, empty, French vessel (Lee 1974:79-80).

Thache again went to Governor Eden and asked that the French ship be given to him as a prize, since "he had found her at sea without a soul on board" (Lee 1974:243-244). Eden granted this request and for his service received sixty hogsheads of sugar. Tobias Knight, Eden's secretary, received twenty hogsheads of sugar. Thache soon after realized that were this French ship recognized, it would result in a violation of his pardon. Thache asked Governor Eden for permission to take the vessel up river and burn her, "thereby never again rising in judgment against them" (Johnson 1998:50). Governor Eden's granted this request.

Free once again to travel without fear of capture, Thache and his men spent the next three or four months on the Pamlico River (Johnson 1998:51), going from inlet to inlet, trading what goods had been acquired with merchants when his mood was friendly and taking what he wanted at other times. The merchants bought the pirates' goods at a fraction of their market value and sold to the pirates, at enormous profit, rum, shot, gunpowder, and supplies for another voyage. The people of the colony were not fearful of Thache on land. He was strictly a sea robber (Lee 1974:66). Maritime merchants Thache robbed knew going to the governor to complain about the pirate's behavior and outright robbery would come to little. Collectively and secretly, these merchants went to the governor of Virginia to complain about the pirate living in their mists (Johnson 1998:52-53).

Alexander Spotswood, after service under the first duke of Marlborough in the

War of Spanish Succession, was appointed lieutenant governor of Virginia in 1710. Spotswood heard stories of Thache and the captured French vessel and saw this act as a violation of the king's pardon. Having enough of piracy plaguing the coast of Virginia and the Carolinas, Spotswood consulted with the commanders of his two men-of-war, the *Pearl* and the *Lyme*. These commanders agreed that the pirate should be captured for violating his pardon. They recommended hiring two small sloops that could easily operate in the inlets to transport a small force of men led by Lt. Robert Maynard, first lieutenant of *Pearl*. The governor quickly called an assembly and issued a proclamation "offering a reward of 100 pounds for the arrest of Thatch, 15 pounds for the arrest of each of his officers, and 10 pounds for each of his crew" (Hughson 1971:77) (Appendix A).

On the morning of 17 November 1718, Lt. Maynard with the *Ranger* and another unnamed sloop, furnished with only small arms and ammunition and no cannon mounted, sailed out of Kicquetan on a course for Ocracoke Inlet, North Carolina (Johnson 1998:54). Maynard recounted the battle in a letter to Mr. Symonds, lieutenant of the *Phoenix*, the station-ship at New York.

> Sir,
> This is to aquaint you, that I sail'd from Virginia the 17th past, with two Sloops, and 54 Men under my Command, having no Guns, but only small Arms and Pistols. Mr. Hyde commanded the little Sloop with 22 Men, and I had 32 in my Sloop. The 22d I came up with Captain Teach, the notorious Pyrate, who has taken, from time to time, a great many English Vessels on these Coasts, and in the West-Indies; he went by the name of Blackbeard, because he let his Beard grow, and tied it up with black Ribbons. I attack'd him at Cherhock in North-Carolina, when he had on Board 21 Men, and nine Guns mounted. At our first Salutation, he drank Damnation to me and my Men, whom he stil'd Cowardly Puppies, saying, He would neither give nor take Quarter. Immediately we engag'd, and Mr.

> Hyde was unfortunately kill'd, and five of his Men wounded in the little Sloop, which, having no-body to command her, fell a-stern, and did not come up to assist me till the Action was almost over. In the mean time, continuing the Fight, it being a perfect Calm, I shot away Teache's Gib, and his Fore-Halliards, forcing him ashoar, I boarded his Sloop, and had 20 Men kill'd and wounded. Immediately thereupon, he enter'd me with 10 Men; but 12 stout Men I left there, fought like Heroes, Sword in Hand, and they kill'd every one of them that enter'd, without the loss of one Man on their Side, but they were miserably cut and mangled. In the whole, had eight Men killed, and 18 wounded. We kill'd 12, besides Blackbeard, who fell with five Shot in him, and 20 dismal Cuts in several Parts of his Body. I took nine presoners, mostly Negroes, all wounded. I have cut Blackbeard's head off, which I have put on my Bowspright, in order to carry it to Virginia. I should never have taken him, if I had not got him in such a Hole, whence he could not get out, for we had no Guns on Board; so that the Engagement on our Side was the more Bloody and Desperate (Lee 1974:233).

Maynard and Thache's remaining fifteen crewmen returned to Williamsburg.

> There was good cheer in Williamsburg that day and a fine feast that evening to both officers and men of the two little ships, while the luckless fifteen were conducted to the Reverend Mr. Jone's [sic] strong sweet prison, there to await trial. Early in the morning after sentence was passed they were marched down Gallows ' Lane, the one leading to Queen Mary's Port, and forthwith hung (Hawthorne 1941:63).

The discrepancy on the numbers of prisoners taken reflect those captured on the ship and in the town combined. Thirteen of those captured in North Carolina were tried and hanged. Only two pirates escaped the gallows. Israel Hands, former captain of *Adventure*, was convicted but released by the timely arrival of a pardon, Samuel Odel was acquitted. According to a letter found aboard Thache's vessel, it appears that Thache had advance knowledge of Virginia's plan (Johnson 1998:54). Tobias Knight had written the pirate explaining that a military operation was imminent (Saunders 1886:343) (Appendix C). Tobias Knight was accused of soliciting with pirates and set for trial, but

died from illness a week before his trial was to begin (Saunders 1886:342).

Piracy along the Atlantic coast was coming to an end. Stede Bonnet was captured in the mouth of the Cape Fear River on 17 September 1718, just three months after parting company with Thache. Bonnet and Ignatius Pell were tried and hung in Charles Town. David Harriot was shot after an escape attempt with Bonnet. The governor of South Carolina, Robert Johnson, was now taking the eradication of piracy into his own hands. On 4 November 1718, the governor, in personal command of four heavily armed vessels, sailed into the Atlantic to destroy the pirate ships hovering around the entrance of Charles Town harbor. The governor and his fleet were successful in killing pirate Richard Worley and many others and bringing others to trial. The courts of Charles Town tried, convicted, and executed a total of forty-nine pirates within a month (Wallace 1934:232-233).

Other pirates who did not accept the king's pardon and continued to ply their trade along the Atlantic included Charles Vane and John Rackham; both were eventually captured. Piracy continued along the Atlantic coast through the first quarter of the eighteenth century. With no permanent base of operations and an increased naval presence in the West Indies and colonial ports of North America, piracy waned.

For a time, piracy was an integral part of inter-colonial trade. Many factors, including the Navigation Acts and the constant warfare of England contributed to the rise of piracy during the early eighteenth century. England was successful in expelling pirates from the Bahamas, but failed to support American colonial efforts to eradicate piracy. The governors of Virginia and South Carolina, colonies that profited most from the

Navigation Acts, finally took action and chased down, tried, and hung pirates, bringing piracy into submission.

Chapter Three

Research Methodology

Prior to conducting a search for *Adventure*, a variety of historical, geographical, geological, and archaeological considerations were explored. This multi-disciplinary approach provided a comprehensive understanding of Beaufort Inlet and assisted in recreating Topsail Inlet in 1718. Once examined, the best method for conducting a search for *Adventure* was determined to be a combined magnetometer and side-scan sonar survey since the site is likely to be buried beneath the soft sediments of the bottom. An accurate magnetic search for anomalies and side-scan sonar survey are a vital part of any underwater archaeological investigation, enabling researchers to locate submerged and buried sites of historical significance. Proper implementation of such a survey not only allows researchers to find a site in the field, but often locate various individual artifacts within the site.

Historical considerations for locating *Adventure*

While the shipwreck located outside Beaufort Inlet (#0003BUI) has not been positively identified by a single conclusive piece of evidence, archaeologists working with the project team from North Carolina's Underwater Archaeology Branch are reasonably certain that the site represents the remains of Blackbeard's flagship *Queen Anne's Revenge* (*QAR*). Although positive identification has not been, and may never be found, all evidence suggests the aforesaid conclusion. This will be discussed further in the Material Analysis section.

Supporting this assumption are two primary source documents. The first document is a letter by Captain Brands, commander of *Pearl* at the time of the *QAR*'s wrecking. Brands reported the sinking of Thache's ship along with the loss of one sloop at Topsail

Inlet. The second document, *The Tryal of Major Stede Bonnet and other Pirates*, contains eyewitness testimonies from two of Thache's crewmembers present at Topsail Inlet in June 1718. Ignatius Pell was Thache's quartermaster at the time of the wrecking; David Harriot was former master of *Adventure*. Harriot's deposition stated that *Adventure* was "run a-ground and wreck'd likewise about Gunshot from the said Thatch" (Howell 1811:1258). Pell confirmed this statement. Since the crewmembers had no reason to lie about the wrecking and Captain Brands had no reason to make a false report, it is assumed the events occurred as reported.

Geographical considerations for locating *Adventure*

To determine the initial location of *Adventure*'s wrecking, the term "Gunshot," used by David Harriot must be examined. By defining this term, an approximate location of *Adventure*'s initial wrecking may be determined. In reading through many documents from the eighteenth-century, it appears that "Gunshot" referred to a cannon rather than a rifle or pistol. A shot from a pistol or musket was referred to as a pistol shot (Heinrichs 1955:53) or a musket shot. Cannon were referred to as guns in most nautical documents reviewed (Saunders 1895:375).

The maximum range of two eighteenth-century cannon commonly mounted on vessels were averaged together, a 6-pounder (2,170 yards) and 3-pounder (1920 yards) (Elliot-Wright 1997:49). The yardage for each cannon shot was based upon firing cast iron shot at five degrees of elevation. Once maximum cannon range was determined, a compass was placed on the *QAR* wreck site using the 1999 NOAA nautical chart 11547 of Beaufort Inlet, and an arc representing 2,045 yards was scribed on the chart (Figure 3.1). Although this radius provides an approximate maximum for the location of *Adventure*'s grounding, it may not provide the current wreck location.

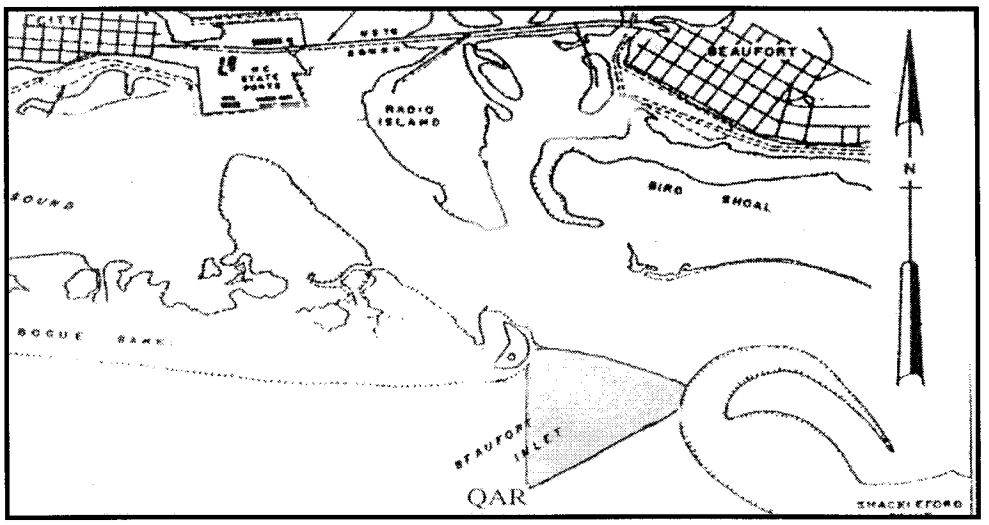

Figure 3.1 Gunshot arc (Costanzo 1972:2).

Geological considerations for locating *Adventure*

Beaufort Inlet is part of the coastal plain, the term applied to the low or partially submerged area, up to 125 miles wide, between the piedmont plateau on the west and the continental shelf on the east. The plain's area exceeds 20,000 square miles, about 40 percent of North Carolina's total area (Wilson 1962:13). Along the coast of North Carolina, barrier beaches have formed by wave and current action in geologically recent times. At the present time, material moves southward from beaches as far north as Cape Henry. The sand crosses the outer bar of Beaufort Inlet where tidal currents cause some of the material to move into the inlet's channel.

The inlet floor is composed of fine to medium grain sand mixed with 3 to 15 percent shell fragments. Samples taken by the U.S. Army Corps of Engineers show that the sediment's shell fragment content decreases as the inlet migrates toward the ocean (Wilson 1962:12). The soil content at the mouth of the inlet is highly unstable and mobile fine sand. It appears that sediment within the inlet travels from east to west, causing erosion of Shackleford Bank's west end and accreting on Bogue Banks' east end

(Wheeler 1947:Plate IV). Sedimentation, caused by tidal fluxes and wave action, has built up on the northern shores of the mainland as well.

The sedimentation process that occurs in Beaufort Inlet led the Corps of Engineers to control the inlet's depth through dredging commencing in 1911. Currently, over one million cubic yards of sand are removed annually and placed in an offshore disposal area seaward of the ebb tide delta disposal areas or along the beach (Roessler 1998:112). Ocean going hopper dredges maintain the channel reaches and the material is dumped at sea. A pipe dredge is used to maintain the protected inner harbor; its material is deposited within the inlet on land disposal areas (Figure 3.2). This process removes not only sediment but also obstructions in the water that could hamper navigation within the inlet.

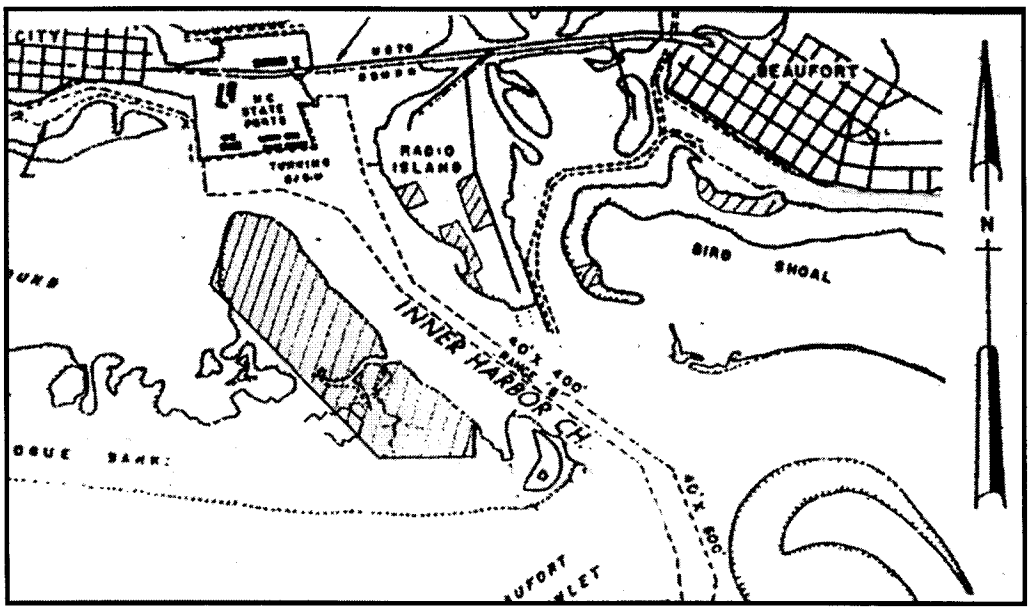

Figure 3.2 Dredge spoils area (Costanzo 1973:2).

Tidal currents moving through the inlet alter the shoreline of Beaufort Inlet. Tides within the study area and along the Atlantic coast are semidiurnal, with an average flood velocity of 2.0 knots and average ebb velocity of 1.8 knots (International Marine

1999:144). Tidal fluctuations within the inlet range from 2.8 feet mean tidal range to 3.4 feet during the spring tides (NOAA 2001:June). The constant flushing causes loose sediment to migrate back and forth within the inlet, filling up dredged channels and altering the inlet's floor. Wind also contributes to the tidal scouring effect. On an annual basis, winds in Beaufort Inlet blow onshore 34.5 percent of the time, offshore 35.1 percent, and alongshore or calm the remaining 29.5 (Heinen 1984:24). Any increase in wind velocity affects wave height and base, contributing to inlet sedimentation movement.

Tropical storms, combined with annual hurricanes, add their own signatures to Beaufort Inlet's aquatic environment. The greatest threat is during August, September, and October when substantial damage results from tidal flooding caused by wind-driven hurricane waves. The accompanying tidal surge reaches 7.1 feet above mean sea level every twenty-five years, 7.63 feet every fifty years, and 8 feet every hundred years (NPS 1974:22).

Waves, currents, and winds reshape Bogue Banks and Shackleford Bank. Their long-term adaptations have been determined primarily by the rate of sea level rise, sea energy, sand supply, and human interference. Topographic changes to the inlet's shores occur as a result of long shore drift, inlet formation and closure, over wash, and redistribution by wind. Between 750,000 and 1,000,000 cubic yards of sediment per year are transported from north to south along the shoreline (NPS 1974:7) (Figure 3.3).

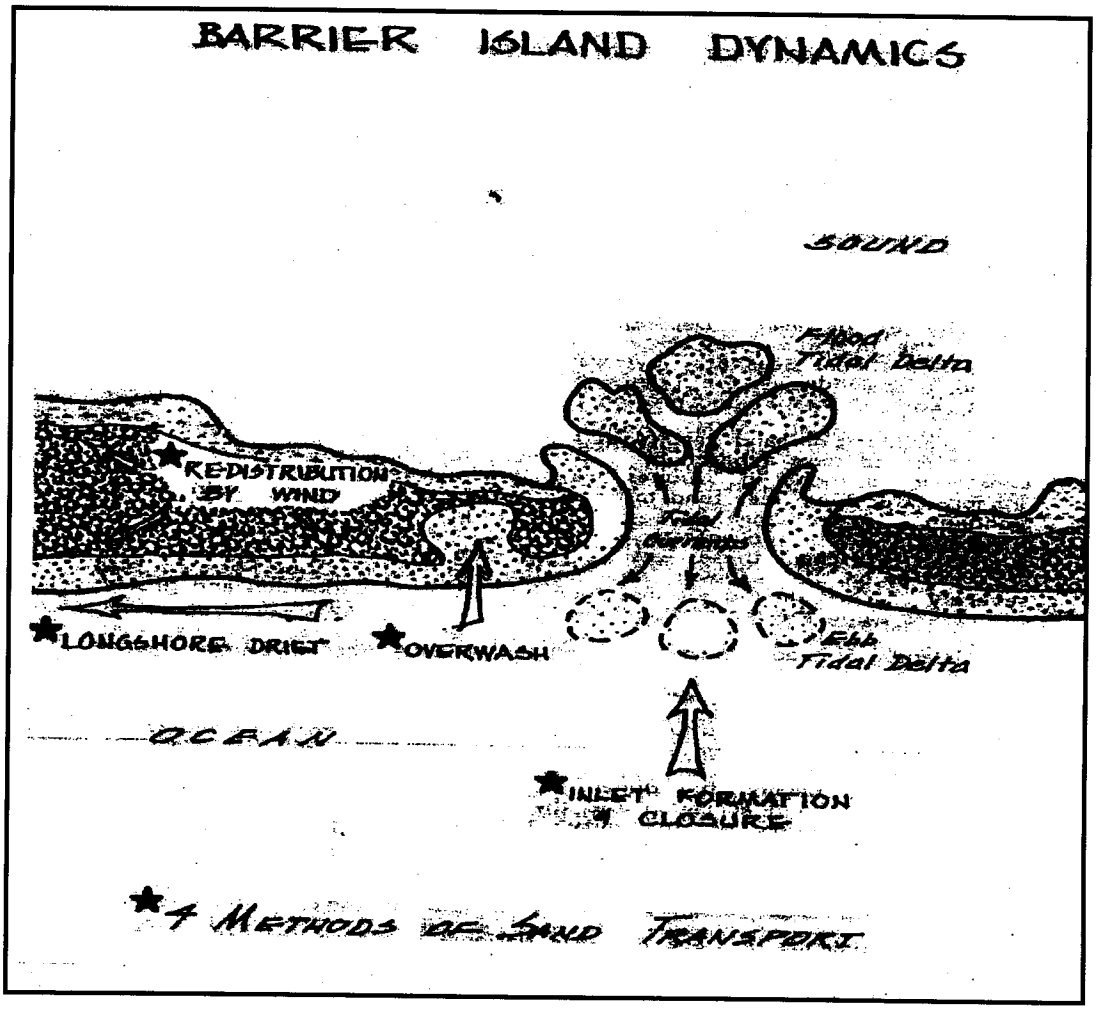

Figure 3.3 Barrier island dynamics (Linn 1981:11).

Historic map overlay

In 1947, the Beach Erosion Board, U.S. Army Corps of Engineers, studied changes in the Atlantic shoreline between 1854 and 1933. The ocean shoreline from the west line of Fort Macon State Park westward for a distance of one mile was eroding at the average rate of .14 foot per year. It was also determined that accretion at the rate of .9 foot per year was occurring along the adjacent shoreline to the west for a distance of two miles (Wheeler 1947:14).

A cursory cartographic study comparing historical maps of the inlet was conducted. Early eighteenth-century maps gave a fair representation of depths within the inlet, but shoreline details are speculative at best. It was determined that five high quality maps could be used to create the map overlay. Six USGS and NOAA charts, representing fifty-year increments were selected for the study. Through the use of GIS technology, the maps were rectified to insure an accurate and comparative database. Once coordinates were established for each map, they were digitized using the Summa Grid IV and input into the AutoCAD program (AutoCAD 1992:Release 12). The digitized maps were then printed upon overhead transparency paper. The maps were placed on top of one another to create an overlay. Once the overlay was complete, the information was extrapolated to the 1733 Edward Moseley map. After comparing the results with the Army Corps of Engineers (Wilson 1962:18), the eastern shoreline of Bogue Banks in 1718 was found to be 39.62 feet farther south than its present position (Figure 3.4).

In recreating Topsail Inlet in 1718, Bogue Banks southeastern shore had less accretion built up and offered safe passage though the inlet, while today's access is from the southwest. Shackleford Bank appears to have changed little on its southern shoreline. Shackleford's northwestern shoreline, however, would project into the inlet, which is today eroded away and submerged. Radio Island and Brandt Island did not exist in 1718, both built up from sedimentation deposits and dredge spoils over the past 284 years. Bird Shoal, now submerged except during extreme low tides, was a prominent land feature in 1718.

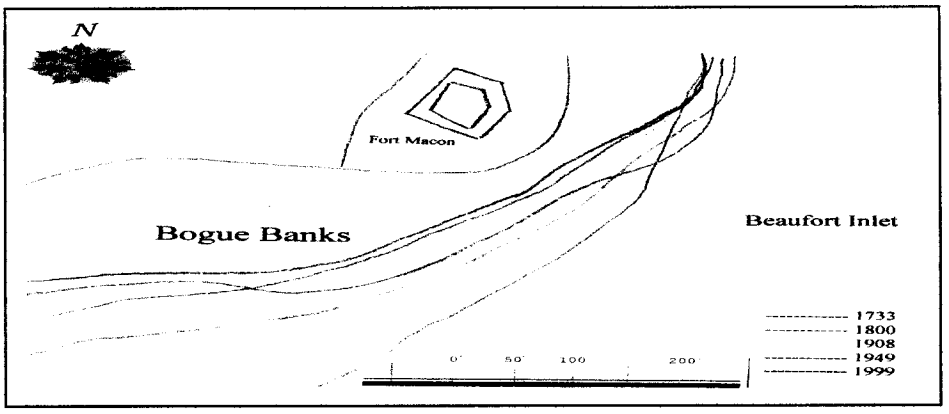

Figure 3.4 Historical maps overlay.

Project Area

Beaufort Inlet

Beaufort Inlet is situated along the central North Carolina coast with its entrance presenting an east-west alignment with the Atlantic Ocean to the south and Bogue Sound to the north (Figure 3.5). The project area extends from the northwest corner of Bogue Banks to the southeast corner of Shackleford Bank, from the northwest corner of Radio Island to the southeast entrance of Beaufort Inlet. Within the inlet are three channels

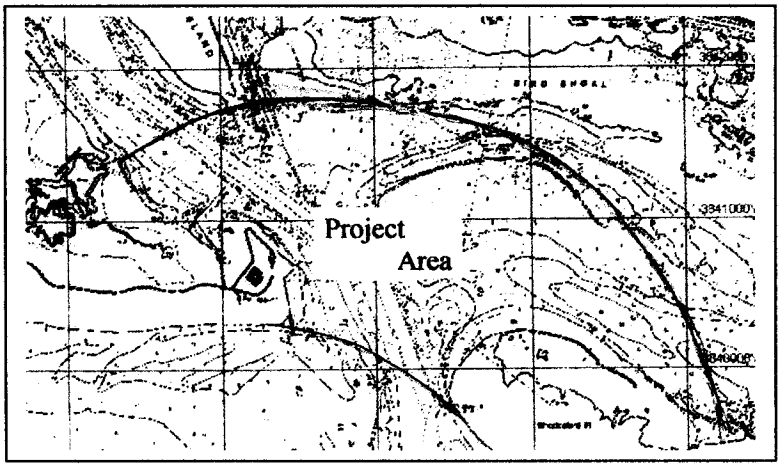

Figure 3.5 Beaufort Inlet (Costanzo 1973:2).

ranging from 10 to 20 meters deep. These channels are the Morehead City Channel, located between Bogue Banks and Radio Island, the Beaufort Channel between Radio Island and Bird Shoal, and the Cutoff Channel, between Bogue Banks and Shackleford Bank (Figure 3.6).

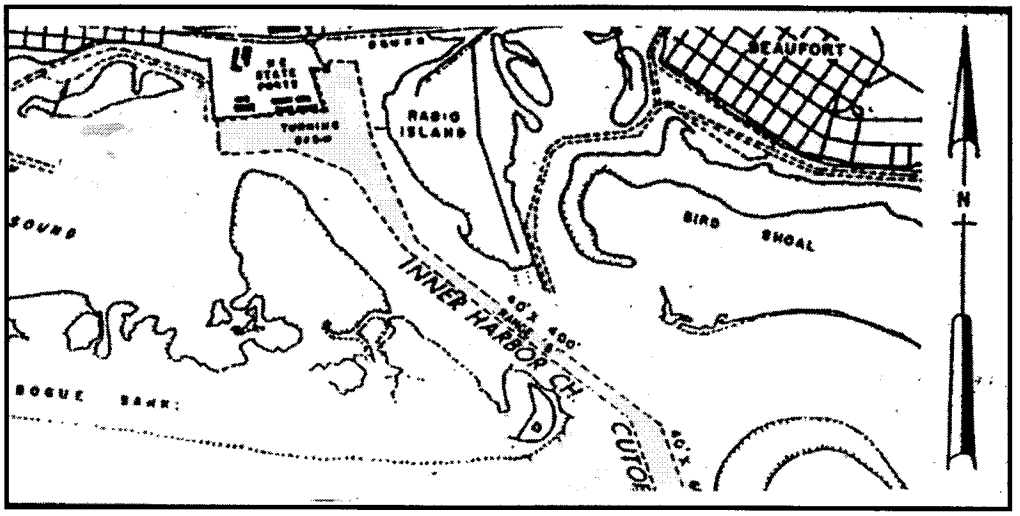

Figure 3.6 Modern Beaufort Inlet Channels (Costanzo 1973:2).

Archaeological considerations for locating *Adventure*

A ship and its contents were specifically selected for a narrowly defined purpose, designed to be self-sufficient and to maintain a shipboard community for extended periods of time (Lenihan 1983:37-64). At the end of a ship's last voyage, transient records are dispersed when the cargo is sold, the crew returns home, and the ship is broken up or abandoned. Only with a shipwreck is the whole unit - ship, cargo, and shipboard community - deposited on the seafloor, creating a material record that is archaeologically recoverable (Muckelroy 1978:68). An underwater archaeological resource, i.e. shipwreck, is the product of a number of processes, which include the process of wrecking, salvage operations, disintegration of perishables, seabed movement,

and characteristics of excavation (Muckelroy 1978:159). Through understanding these processes, archaeologists can develop methodologies and eventual interpretations of a site.

Building on Muckelroy's model, the five processes were addressed using available primary sources to determine an effective methodology for locating *Adventure*. Wrecking and salvage operation (Filters) information comes from two primary sources, the depositions of Ignatius Pell and David Harriot. Harriot stated that *Adventure* "run a-ground and wreck'd," and the ship was stripped of anything of value (Howell 1811:1258). Harriot's comment indicates that the crew had time to abandon the ship and remove valuable items prior to sinking. Items left on *Adventure* included those either too heavy to remove, such as cannon, shot, and large anchors, or items of repetition (sails, rigging, cooking equipment), or of little value. The Muckleroy model indicates that once a ship is consumed by the inlet, it is probable that heavy items, cannon, anchors, cooking kettles, and other metal objects were buried. Lighter objects made of wood, cloth, or other organics, such as barrels, sails, rigging, clothing, books, etc. were carried off by the currents (Scrambling factors) or eventually disintegrated with little chance for survival. The hull may have been spared if rapidly absorbed into the sediment. Sediment could provide protection from light and oxygen, two major factors contributing to wood's destruction in the underwater environment.

Beaufort Inlet's seabed movement is a significant factor in locating *Adventure*. The inlet's currents, dredging, and sediment transportation processes have caused dramatic changes over the last 284 years. The dynamic environment possibly scattered lighter and more fragile wreck material over a large area. Muckelroy's final process involves destructive forces, or "scrambling devices," associated with excavating a shipwreck and was not evaluated because there is no evidence that this wreck was ever

found, let alone salvaged.

In evaluating the best method to conduct a survey within the inlet, the site formation process was evaluated further. The *Adventure* wrecking process may resemble Gearhart's model of a Buoyant Hull Fracture described as, " When a ship's hull breaks apart soon after becoming beached, the potential for anomaly sources, such as iron fittings or magnetic ballast material, to become scattered away from the main body of the wreck .... Waves of sufficient energy to break up a ship might also be expected to distribute vessel elements high onto the beach. At the same time, littoral drift would tend to transport buoyant elements down current. We would, therefore expect a buoyant hull fracture to consist of a pattern of multiple anomalies radiating upslope and down current from an area of more tightly clustered, higher intensity anomalies" (Gearhart 1988:41). If the *Adventure* site was a buoyant hull fracture, it would have a large, central magnetic anomaly signature, representing the initial wreck site and contain cannon and heavy anchors. A pattern of multiple anomalies following a down current and upslope pattern with anomalies ranging from 5 – 85 gammas in strength indicating buoyant material that drifted away from the initial wreck site.

Description of equipment

The dynamic nature of Beaufort Inlet and the geographical changes this area has undergone indicate preservation of *Adventure* would be marginal at best. Based on the above processes affecting *Adventure*'s sinking, the best method of detecting *Adventure* is a combined magnetometer and side- scan sonar search. The magnetometer can detect submerged ferrous material (iron chain, fittings, cannon, anchors) while the side-scan sonar can detect any non-ferrous material (planking and hull structure) re-exposed in this energetic environment. Operating under a permit provided by the North Carolina Department of Cultural Resources and its Underwater Archaeology Branch, 00BES609,

the search for *Adventure* began during the first week of June 2001. The survey area covered approximately two square nautical miles within the Beaufort Inlet.

Magnetometer Operational Overview

The information contained within this section of the report presents an introductory overview of the general principles involved in operating a proton-procession magnetometer and a side-scan sonar. A magnetometer is a passive device that measures the strength of the local magnetic field. A magnetometer consists of a sensor, a data storage unit, an interconnecting cable, and a power supply. Magnetometers can detect ferrous materials, such as iron, but cannot detect non-ferrous materials, such as bronze or silver.

The spinning earth behaves much like a magnet, with north and south magnetic poles. At any point on the earth, there will be natural magnetic field strength. Concentrations of ferrous material, such as iron anchors, cannon, or ships' fittings will alter that field and produce a magnetic anomaly (or variation). It does not matter whether the iron material is buried or exposed. The shape and size of the anomaly give clues to the mass of iron producing it and the depth of the burial.

The unit of measurement of magnetic field strength is the gamma. The earth's natural magnetic field ranges from 30,000 to 60,000 gammas, depending upon location. A proton-procession magnetometer can detect anomalies in the local field of less than 1 gamma. The strength of an object's magnetic field decreases with the cubed distance between the sensor and object. This means that the magnetometer sensor must be towed relatively close to the object to detect it. As a rough guide, a large steel wreck can be detected at a range of 120 – 180 meters, a site with iron anchors and cannon at 80 – 100 meters, an isolated cannon at 30 meters (Mazel 1985:87)(Figure 3.7).

Table of Anomalies of Common Objects
Typical Maximum Anomaly

object	Near Distance	Far Distance
Automobile (1 ton)	30 feet 40 gammas	100 feet 1 gamma
Ship (1000 tons)	100 feet 300 to 700 gammas	1000 feet 0.3 to 0.7 gammas
Light Aircraft	20 feet 10 to 30 gammas	50 feet 0.5 to 2 gammas
File (10 inch)	5 feet 50 to 100 gammas	10 feet 5 to 10 gammas
Screwdriver (5 inch)	5 feet 5 to 10 gammas	10 feet 0.5 to 1 gamma
Revolver (38 special or 45 automatic) (induced approximately equal to permanent, see text)	5 feet 10 to 20 gammas	10 feet 1 to 2 gammas
Rifle	5 feet 10 to 50 gammas	10 feet 2 to 10 gammas
Ball Bearing (2mm)	3 inches 4 gammas	8 inches (0.5 feet) 0.5 gamma
Fenceline	10 feet 15 gammas	25 feet 1 to 2 gammas
Pipeline (12 inch diameter)	25 feet 50 to 200 gammas	50 feet 12 to 50 gammas

Figure 3.7. Anomalies of Common Objects (Breiner 1999:46).

Geometric G-886 Magnetometer

The Geometric G-886 magnetometer (Figure 3.8) was the main survey instrument for this project. The G-886 utilizes the procession of spinning protons or nuculei of the hydrogen atom in hydrocarbon fluid to measure magnetic intensity. The G-886 records this data in gammas (g) every two seconds. The local magnetic signature for Beaufort Inlet area ranges between 54,000g and 55,000g. Readings were taken twice a day, in the morning and mid afternoon to assess the local magnetic reading (relative zero). In the mornings, during high tide, the area reflected 55,850g, while in the afternoon during low tide, the readings were 55,350g. Once data were collected from a given area, they were reviewed and edited to remove any magnetic noise and incorrect readings. The data were

then transferred to Golden Software's Surfer32 Surface Mapping System. Surfer32 created interpretive surface and magnetic contour maps from the edited data to provide a complete view of the areas surveyed.

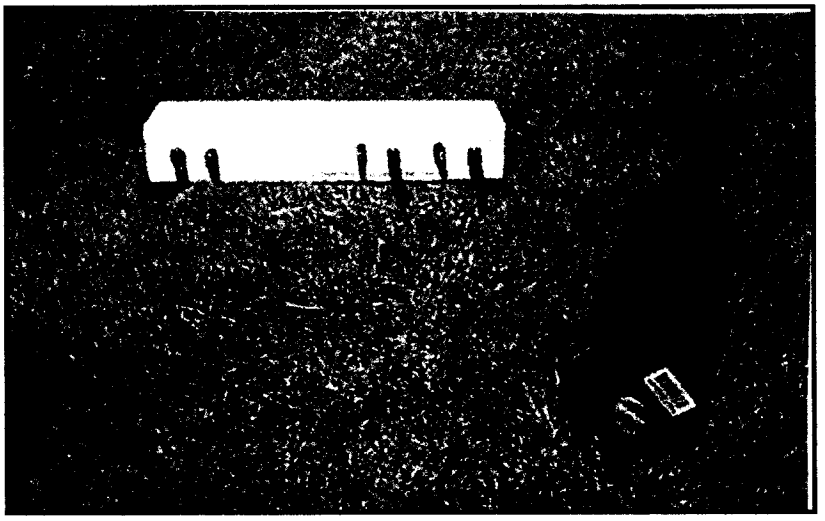

Figure 3.8. Geometric G-886 magnetometer and processor.

Garmin GPSMAP 225D

To locate anomalies accurately, a differential global positioning system was incorporated into the project. The Garmin 225D differential global positioning system (DGPS)(Figure 3.9) provided navigational positioning data for both the survey vessel and the G-886 magnetometer. Navigational data were recorded and updated by the Garmin 225D at the rate of twice per second.

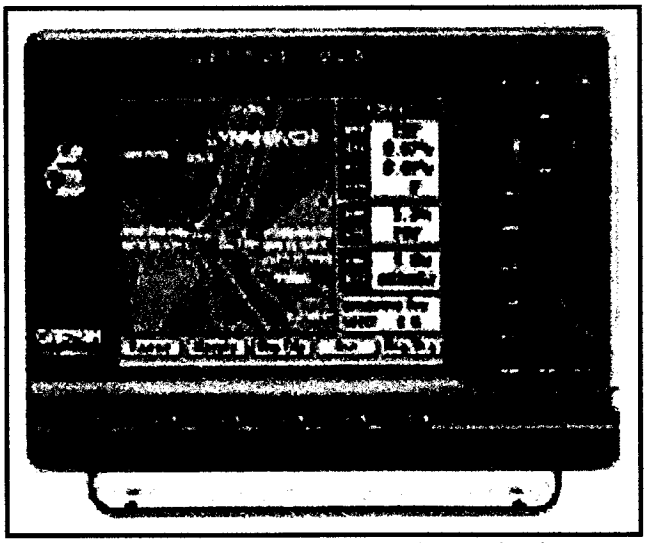

Figure 3.9. Garmin 225D Global Positioning System.

Coastal Oceanographic's Hypack Max

To guide the survey vessel within the inlet, survey software linked the DGPS, magnetometer, and survey vessel. Hypack Max (Hypack Max 1999:Version 6.2) is a hydrographic survey software that enables users to set up and run specific survey lines. This software allowed a digital chart to be incorporated on which planned survey lines were constructed. Hypack Max also recorded the Garmin 225D navigational data and the G-886 magnetometer data to locate accurately magnetic anomalies recorded by the G-886. As the G-886 magnetometer measured magnetic intensity within a specified area, Hypack Max interpreted the variations in magnetic intensity as depth. To keep local magnetic readings even during tidal fluctuations, NOAA tide tables (Appendix G) were input into the Hypack program to adjust for variances. The Hypack Max programs provided editing and tide adjustment corrections during the survey. A Dell PC with Windows 2000 operating software ran the software program.

Side-scan Sonar Overview

A side-scan sonar is an acoustical device that uses sound waves to produce a

graphic record of the seafloor. The side-scan sonar is made up of the torpedo-shaped tow-fish, containing the sonar transducer, a data collection computer, an interconnecting cable, and a power supply. The transducer transmits pulses of high or low frequency sound (in this case 600 KHz) to both sides. The pulses are transmitted in narrow beam in the horizontal plane, giving good resolution, and a broad beam in the vertical plane, providing wide area coverage (Figure 3.10).

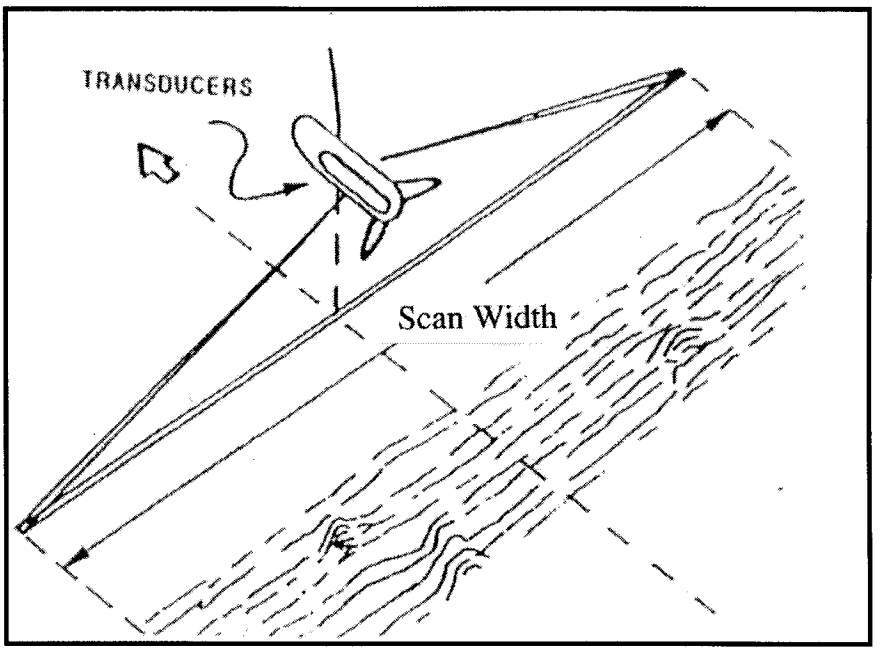

Figure 3.10. Side-scan image formation (Mazel 1985:1-5).

Sound is returned to the sonar by reflection from the seafloor and targets. The returns from successive pulses captured by the computer. Side-scan sonar produces a detailed graphic image of the surface of the seafloor, similar to an aerial photograph. Areas of rock, pilings, sand, mud, and other materials can be distinguished. Evenan archaeological site has some visible trace on or above the seafloor containing only non-ferrous material, it can be located by the side-scan sonar. A side-scan sonar cannot detect

or produce images of objects completely buried beneath the seafloor. Extremely rocky or irregular bottoms can make it difficult to interpret sonar returns.

Marine Sonics Sea Scan 600 kHz side-scan sonar

The Marine Sonics Sea Scan 600 kHz side-scan sonar (Marine Sonics 1998: Version 4)(Figure 3.11) was used June 6-8. This equipment provided limited quality because of tidal currents and shallow water. On the few days that calm survey lanes were run, the Sea Scan 600 provided remarkably detailed representations of the Beaufort Inlet Floor. The Sea Scan 600 used its own DGPS to locate potential targets and operated separately from Hypack Max and the G-886. All three units were synchronized for time and positioning data.

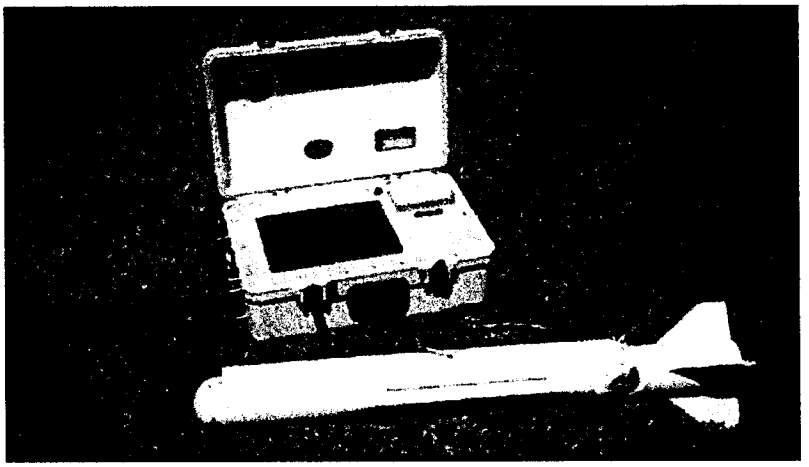

Figure 3.11. Sea Scan 600 kHz side –scan sonar computer and towfish.

Survey Vessel

East Carolina University's Privateer (Figure 3.12) provided the work platform for the equipment and staff for the term of the project. The Privateer, a twenty-four foot, shallow- draft vessel allowed shoreline survey capability. The Privateer was docked at the North Carolina's Division of Marine Fisheries Morehead City facility.

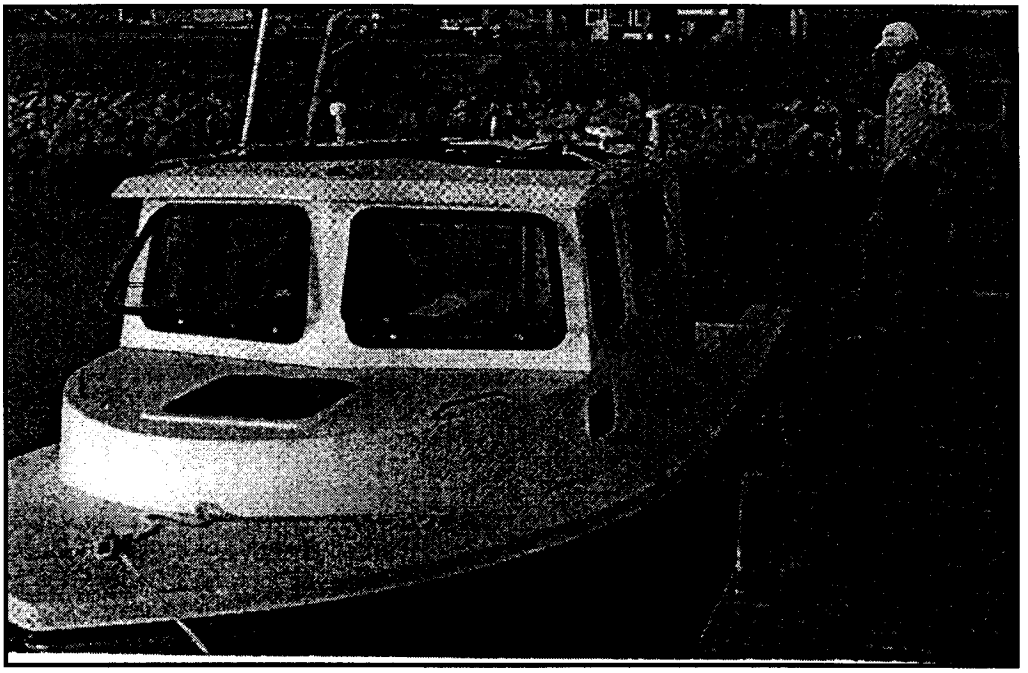

Figure 3.12. Survey vessel Privateer.

Description of Work Conducted

The varying depths within Beaufort Inlet, caused by tidal variation, dredging, and erosion, required a scale model to better understand the inlet floor (Figure 3.13). NOAA Chart 11547 was used to determine depths and inlet floor contours. The model was used to determine areas of rapid seafloor changes for navigation and survey purposes.

A key to understanding the processes affecting a wreck site is gaining knowledge of the environmental factors influencing the area. By incorporating the geological and geographical structure of the inlet, it is possible to locate areas with the highest probability for containing wreckage. The 3-D model provided a visual image of the bottom contours of the inlet. Areas of shallow depth associated with a sharp drop off were explored because they represent areas in which wreckage has been trapped by the sediment with the sediment eroding away on the down current side. The inlet can be seen

sloping upward from south to north, providing another area to trap wreckage and possibly creating an area along or within the shoreline for wreckage to be located.

Figure 3.13. Beaufort Inlet 3-D bottom contour map.

Methodology

Planned survey lanes based upon previous research incorporating historical maps, sediment re-deposition models, and the inlet model were established in the Hypack program. Channel areas were excluded from because they have been heavily dredged, and any material would have been previously removed. Survey lanes were input into the Hypack Max hydrographic survey program on a daily basis. The survey program then provided the research team with a daily "roadmap" over which the survey was run.

The survey was conducted over a four-day period from June 4-8, 2001. The first day on-site consisted of setting up equipment, handling local logistics, and running sample survey lanes to ensure equipment was working as planned. A specific inlet area was surveyed each day and documented using Hypack Max and G-886. Survey lanes were kept 30 meters apart to capture maximum magnetometer data. Because of the

magnetometer's sensitivity, the G-886 sensor was towed fifty feet behind Privateer, minimizing magnetic signatures that might have been picked up from the Privateer or its equipment. The G-886 was towed on the water's surface to prevent grounding in the shallow water. The Sea Scan 600 was positioned on the port side of the Privateer at varying depths, dependant upon the inlet's bottom contour. The Sea Scan 600 was programmed to view sixty-six feet on either side to provide overlapping coverage of survey lanes. The Privateer maintained a speed of 4.5 knots, (2.32 meters per second), enabling remote sensing equipment to record data effectively.

The magnetometer data collected through the Hypack Max software were time tagged, and their UTM (Universal Transverse Mercator), latitude / longitude position, time of day, and magnetic reading were recorded. The Geodetic parameters established for this survey incorporated UTM Zone 18 coordinates using WSG 1984 ellipsoid, with distance units set for meters. Data were backed up on CD for future editing and analysis. Raw data were analyzed and processed within Hypack Max's Single-Beam Editor program (Hypack Max 1999:IV-1-2) to remove false magnetometer readings because of turns and the vessel yawing off planned survey lines. Known targets that presented a magnetic signature, such as buoys and steel-hulled vessels seen and recorded during the survey, were removed.

Each sonar image was recorded with date, image number, time, and latitude / longitude. As an example, Target 003-06 represents June 6th and target number 3. For each target, the time of contact, latitude / longitude position, length, and width are given (Appendix F). Magnetometer target locations within the survey areas are identified by the day of the survey, time of contact, area of the contact, and survey lane number. As an example, Tue1038-1:4 indicates that the target was located on Tuesday at 10:38 am, area 1, survey lane 4 (Appendix E). When preparing survey lanes, special attention was paid

to the inlet's tidal flows. Shallow areas could only be reached during high tide, while deeper areas could be surveyed during low tides.

Once magnetometer data were edited and sorted, they were converted into an ACSII XYZ file format. This format allows modeling programs, such as surface mapping or topographic modeling software systems, to read the data in its own language. The XYZ co-ordinates represent the easting (X) the northing (Y) and the magnetic value (Z). The modeling program selected for this project was Golden Software's Surfer32 Surface Mapping System, version 6.04 (Surfer32 for Windows 1996:10-1-18). Surfer32 visually illustrates magnetic contours in each survey area and allows comprehensive interpretation of the data.

Beaufort Inlet's currents, dredging, and sediment transportation processes have caused dramatic changes through the centuries. The amalgamations of these changes combined with the wrecking processes analysis lend themselves to searching the inlet using remote sensing equipment. The principal and perhaps the most effective method for locating submerged cultural resources is a combination of magnetometer and side-scan sonar. These two systems, one for identifying exposed objects and the other for detecting ferrous material on or below the bottom surface provides invaluable data in a cost effective and timely fashion.

Chapter Four

Comparative Analysis

After 282 years in the dynamic environment of Beaufort Inlet, it is expected *Adventure* left behind little archaeological evidence. To understand the smallest amount of uncovered material culture and associate these with *Adventure*, it is necessary to develop criteria from which identification can be made. Wrecks with little or no associated artifacts can often be dated by structural evidence and their origins of construction identified. Consequently, specific details of vessel construction unique to the period must be identified. A comparative study of sloops from the colonial period provides insights into the regional shipwright's method of construction and wood types used in the examples that follow. The material assemblages from two contemporary pirate vessels will also assist in developing parameters for identifying *Adventure*. Although individual artifacts or ship fragments may not conclusively identify *Adventure*, the combination of such items found in high concentrations and *in situ* may build enough circumstantial evidence to support her identification.

Eighteenth-century sloop construction

In 1718, Thache captured *Adventure* "ten leagues short of the Bay of Honduras"(Johnson 1998:48). *Adventure* has been described as an " 80-ton sloop participating in the logwood trade" (Moore 1997:32). Britain, Spain, France, Holland and the British colonies were at war between 1688-1697 and again between 1702-1713. During those conflicts British, French, and Spanish ships were captured by privateers and legal ownership changed hands. In 1718, ships from these nations were trading in the West Indies. A clue to the type of sloop lies in *Adventure's* name, and the name of her master, David Harriot. Both the ship's name and Harriot are English. Although French, Spanish, and Dutch sloops cannot be ruled out as the countries of construction, little

archaeological or historical diagnostic data exists which could provide conclusive identification. For the purpose of this study, British and colonial sloop construction methods will be examined.

The word sloop is defined by the *Oxford Companion to Ships and the Sea* as "a sailing vessel with a single mast, fore-and-aft rigged, setting, in Western Europe, a single headsail" (Kemp 1998:809). This section will examine the construction methods of four eighteenth-century sloop types, along with archaeological remains of two eighteenth-century sloops. In examining construction methods of these vessels, focus will be on diagnostic information that might assist in the identification of *Adventure.*

In some localities, unusual conditions led to developing various types of small, fast sailing vessels. The West Indies, where merchant traders, privateers, pirates, and naval vessels from many countries cruised among the islands, was one of these. No vessel was safe from capture, and if not large enough to fight off an attacker, safety lay in speed. Moderate sized, fast vessels capable of concealment in small harbors were in demand and supplied by shipbuilders on the various islands, particularly those of Jamaica, who developed a sharp-model sloop (Baker 1966:111).

The Jamaica sloop's characteristics were drag to the keel, considerable rise of floor, raking ends, low freeboard, and a raking mast. Jamaica sloops had such a reputation for speed and weatherliness that orders for new sloops depleted the supplies of suitable timber on the island. Large numbers of shipbuilders then moved to Bermuda, where abundant growths of light red cedar proved eminently suitable for the continued building of this craft, which then became known as the Bermuda sloop.

A plan of a Bermuda-like sloop has survived in the outline drawing of the British sloop *Ferrett* of 1711 (Figure 4.1). Built in England, the *Ferrett*, had a length on the gun-deck of 65 feet 7 inches and a keel length of 50 feet. The breadth inside her planking was

20 feet 10 inches, with a depth of hold of 9 feet. Her tonnage was given variously as 113 and 117. The outline of her midsection shows a rise of floor of 14.5 degrees with a slight hollow in the garboard strakes and a slight flare at the shear strakes. This flare allowed for improved stability and did not restrict room on deck for working guns. The stem was curved while the sternpost was raked. In company with most small vessels of her time,

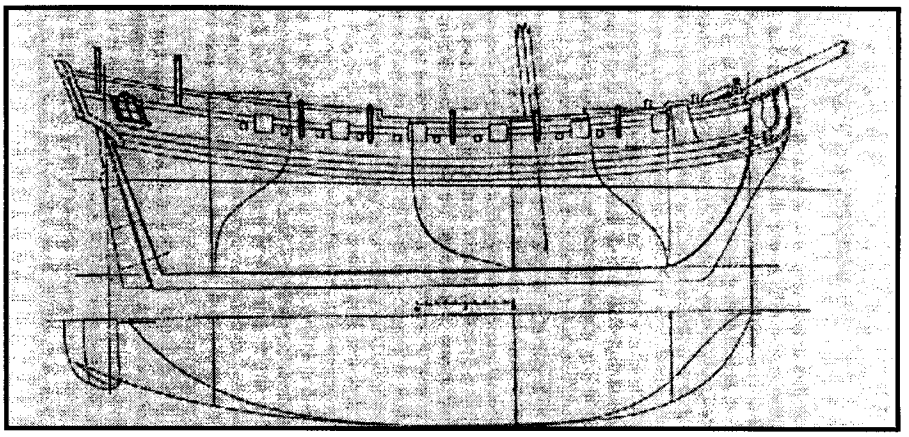

Figure 4.1. *Ferrett, 1711* (Baker 1966:112).

Ferrett had ports for eight pair of sweeps and could be propelled while in calm water. Key elements that may indicate *Adventure* was a Jamaica or Bermuda sloop would include the presence of red cedar or other tropical hardwoods, and a keel length not exceeding 50 feet. Attached to a portion of the keel would be the garboard strake showing a slight curvature or hollow. The stern post and mast step would be raked.

Trade with Bermuda and the West Indies introduced the swift Jamaica or Bermuda sloop to the Chesapeake Bay. During the first half of the eighteenth-century, Maryland and Virginia shipyards turned out many sloops of this type (Baker 1966:115). The majority of colonial craft were small. The largest proportion of vessels at the time are sloops ranging from 25-70 tons (Chapelle 1935:11). The oldest surviving plan of an

American-built vessel is a sloop of the Bermuda type, *Mediator*, built in Virginia in 1741 (Figure 4.2).

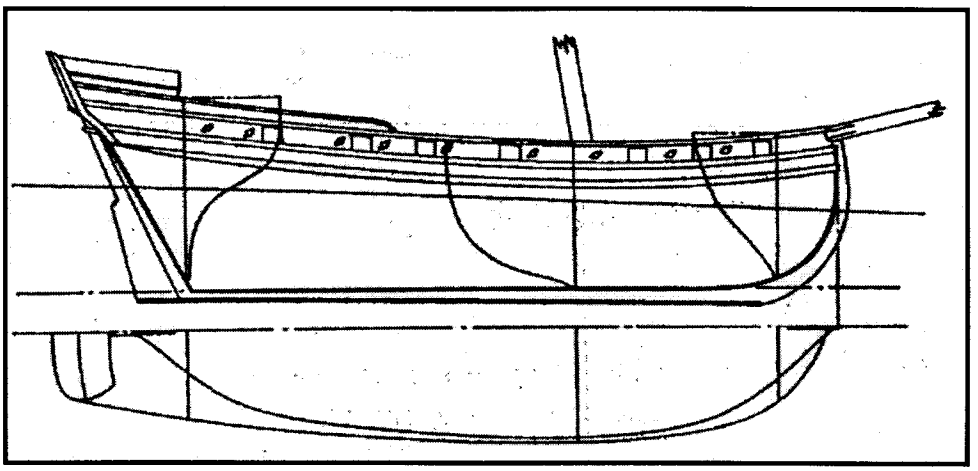

Figure 4.2. Virginia-built sloop *Mediator* (Baker 1966:115).

The *Mediator* was slightly smaller than the *Ferrett*, with a length on deck of 61 feet 4 inches. Her breath inside the planking at deck level was 20 feet 11 inches, her depth of hold 9 feet 9 inches, and was 104 tons. *Mediator*'s midsection shows a similar hollow in the garboard strakes, and her rise of floor was greater than *Ferrett* - 20 degrees versus 14.5 degrees. There was more flare to the sheer strakes. Both *Ferrett* and *Mediator* had similar curved stems and raked sternposts. While sea-sloops built on the Bermuda model were popular with merchants from the Chesapeake and New England, it cannot be assumed that all sloops had such features. The *Mediator* had one feature of the Bermuda-type sloop missing in *Ferrett*- a short stern cabin with a highly crowned top. Features that may indicate *Adventure* was of Virginia construction would be difficult to distinguish from that of a Bermuda sloop. Similar curvature to the garboard strake and rake of the stern post and mast step exist on both ship types. Should a portion of the floor remain, the distinguishing difference between the degrees of rise would provide some supporting

evidence.

Ordinary trading vessels sailing in less hazardous waters did not have need the extreme characteristics of the Jamaica or Bermuda sloops. A hoy was a single-mast, small vessel capable of carrying passengers and cargo, particularly short distances along coastal routes (Figure 4.3).

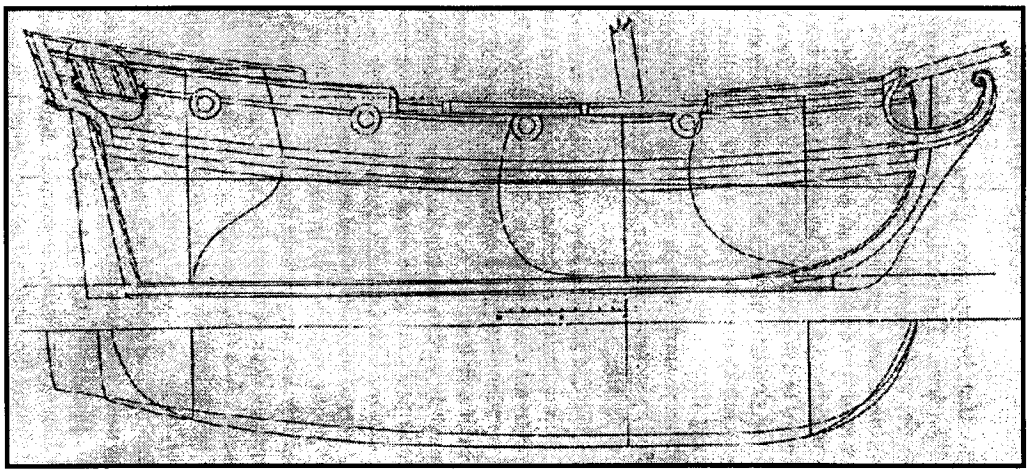

Figure 4.3. British hoy, ca.1720 (Baker 1966:114).

Nearly the same size as *Ferrett*, a hoy had a length on deck of 64 feet and a keel length of 47 feet 6 inches. The breadth inside her planking was 19 feet 6 inches. There was no hollow in the garboard strakes, and considerable tumblehome, which would have constricted deck space (Baker 1966:113). Her midsection showed very little rise of floor, while each end showed a 25 degrees rise of floor with a raked stem and sternpost. Characteristics expected to be found on *Adventure* characterizing her as a hoy would include the lack of hollow in the garboard strake combined with a substantial rise of floor compared to vessel styles discussed earlier. Another distinguishing feature would be the tumblehome of the ship as compared to the outward flare of the Virginia and Bermuda sloops.

An English sloop built for the French wine trade (Figure 4.4), was more characteristic of a large cargo ship than a sleek bodied Bermuda sloop. A wine sloop had a length on deck of 58 feet, a keel length of 43 feet 3 inches, a breadth inside her planking of 17 feet 9 inches, and a depth of hold of 11 feet. There was no hollow in the garboard stakes, a 7 degrees rise of floor, and a slight tumbled home. Key diagnostic features that would identify *Adventure* as an English wine, or cargo sloop include the rise of floor at only 7 degrees, a short keel length, the presence of white oak, and the lack of hollow in the garboard stake combined with a tumblehome configuration in the sheer strake.

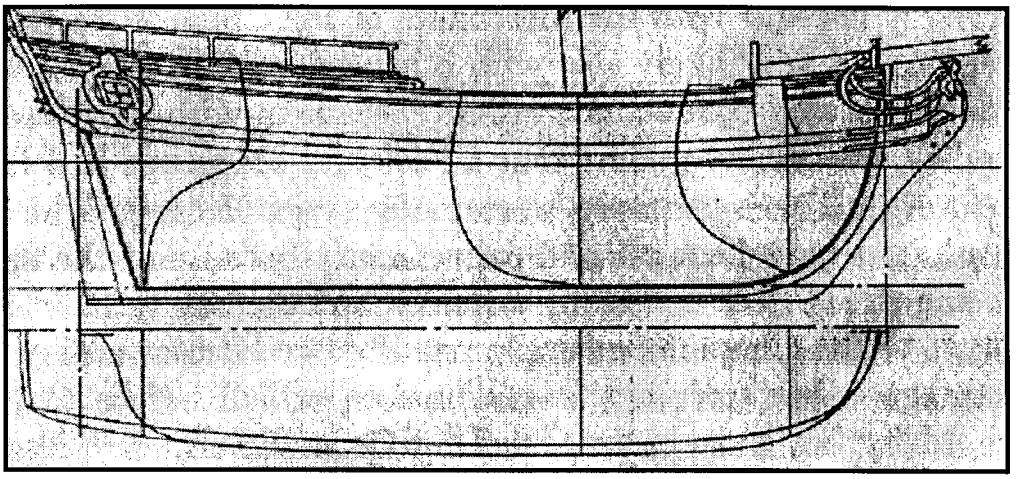

Figure 4.4. English sloop for the wine trade (Baker 1966:118).

Very few eighteenth-century sloops have been archaeologically documented. Two sloops will be examined to assist in understanding construction methods employed during this period, the Reader's Point and Terence Bay wrecks. The Reader's Point wreck (Figure 4.5) was located in St. Ann's Bay on the north shore of Jamaica. The vessel was a medium-sized, lightly-built sloop. It measured 59 feet from the bow to the stern knee (Cook 1995:103). The keel was maple and averaged 11.7 inches moulded and 9.36 inches

sided. The keelson was a single oak timber 36 feet in length. A rectangular mortise was

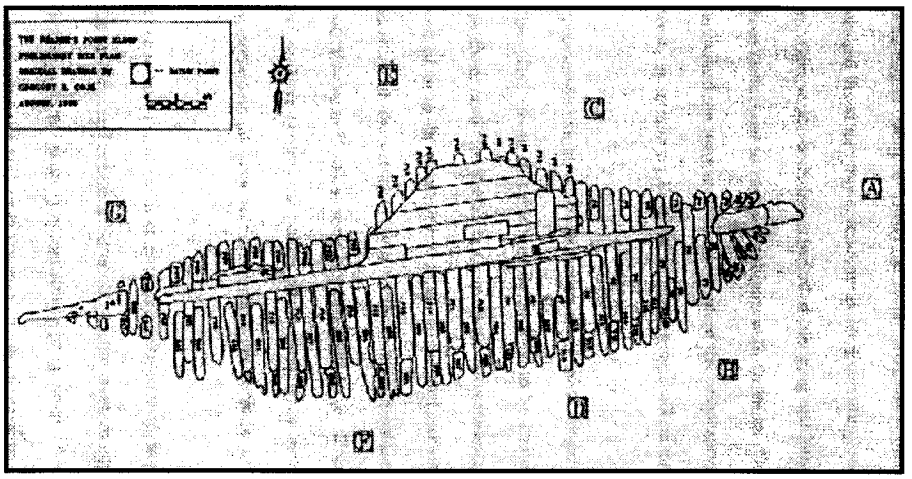

Figure 4.5. Reader's Point wreck (Gottschamer 1995:7).

cut into the keelson for the maststep approximately one third of the vessel's length aft. Radial cant frame construction (Figure 4.6), a technique documented on other eighteenth-century vessels, formed the bow of the Reader's Point sloop (Morris 1991:62-64).

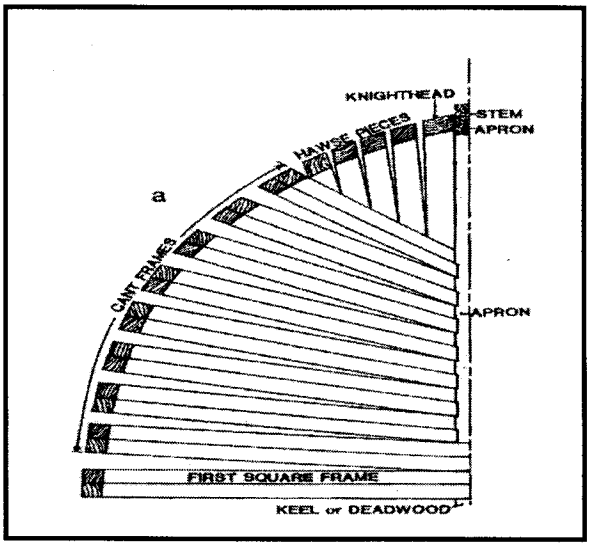

Figure 4.6. Radial cant framing (Steffy 1994:294).

The majority of frames were square and even, except for a few that probably were repairs. White oak was used for all floors, futtocks, outer planking, ceiling, keelson, bow timbers, and treenails. Floors were attached to the maple keel with iron bolts. Floor timbers were spaced between 9 and 12 inches apart. Forward of amidships, the futtocks were attached aft of the floor timbers, aft of amidships, the futtocks were attached forward of the floor timbers. Horizontal treenails connected floors and futtocks. Every floor was a made frame, except amidships where the pattern shifted to every third floor forward. Un-wedged treenails fixed most planking, although a few iron nails were detected. The keelson was notched to fit over the floors throughout the length of the keel. Limber holes were cut into the floors 1'5" off centerline of the keel on both sides and measured 1 ¼" high and 3" wide. The mast step was located aft at one-third the length of the vessel. The stern knee was a single oak timber (Gottschamer 1995:12).

The vessel bore evidence of heavy use and subsequent damage. In addition to the replacement frames, there were repaired and replaced ceiling planks (Gottschamer 1995:12). At the maststep, a split on the starboard side of the keelson extended three meters forward from and through the mortise. To repair the keelson, two iron bolts were driven horizontally through it. The keelson was also horizontally spiked to two sister keelsons.

The Terence Bay wreck was located in a shallow, sandy cove southwest of Halifax, Nova Scotia, in 1980 (Figure 4.7). The wreck was surveyed and excavated by the Underwater Archaeology Society of Nova Scotia between 1980 and 1983. Construction details follow expectations for a small mid-eighteenth century English or New England built-sloop. The Terence Bay wreck was framed, planked, and ceiled in oak (probably white oak, Quercus alba) and fastened with a combination of oak treenails and iron bolts, spikes, and nails. The ceiling was not caulked (Carter 1985:15). Scarf joints

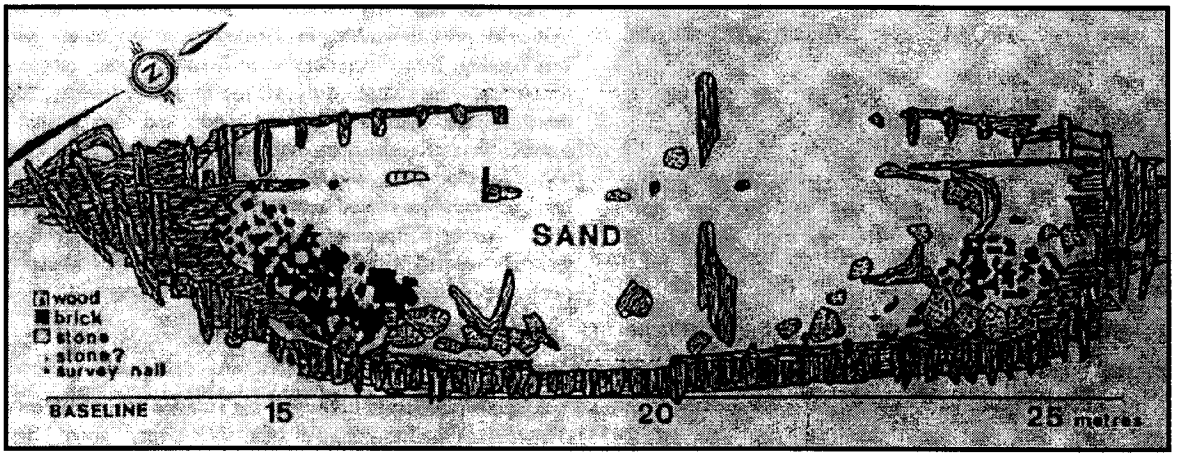

Figure 4.7. Terence Bay wreck (Carter 1985:13).

between adjoining planking were seen in 3 of the 9 surviving strakes.

Deck beams were attached by oak hanging, and standing knees with the latter forming a continuous band around the hull. The deck did not survive, but many chips of red or Scots pine were found in the hull, suggesting a fir deck (Carter 1985:15). Little outer planking was visible. A visible strake showed a simple butt joint with both ends spiked to the same timber. Some ceiling and outer planking was deeply charred on inner faces, which contact the frames, presumably as a rot-prevention technique or an aid to bending (Carter 1985:16).

The vessel appears to have been built using a few mould frames, with most of the skeleton being added during and after the planking process. This technique may have been typical of colonial ship construction (Baker 1954:80-81). Of fifty-three timbers located at the wreck site, at least two are treenail fastened pairs, in the manner of conventional double frame (Carter 1985:16). Of particular interest is the mode of framing the stern. It appears the shipwright planked over the mould frame to the stern post and

transom, filling the spaces between the futtock, which necessarily flared aft and toward the deck to take account of the longer runs of planks farther from the keel (Carter 1985:16). The outer planking was covered with a mixture of pitch and animal hair beneath pine sacrificial planking.

Based on this limited sample, several key points may help identify the origins of *Adventure*. New England sloops differed sharply from sloops built in the Chesapeake. New England shipyards tended to build sloops with less deadrise, less draft, and more tumblehome similar to the Reader's Point vessel. The wood types used may also provide a distinction between these vessels. The use of red pine, a species not found south of New Jersey (Cook 1997:86), and white oak, not found north of Maine can narrow the area of the ships construction. Common elements found in vessels of the early eighteenth-century include the presence of radial cant framing in the bow, the presence of treenails used as the primary mode of fastening, tar and pitch caulking found with sacrificial planking, a single mast step, one third down the keels' length, the keelson cut to accommodate the floor timbers, and the presence of double framing.

Locating key elements through the use of side-scan sonar imaging depends upon these various components being exposed. Measurements of frames, keel, and planking can be made with the side-scan sonar software. Individual floors and futtucks can be seen clearly and will indicate the presence of a wreck presenting the characteristics described above.

A magnetometer depends on the presence of ferrous material to record a disturbance in the magnetic field. Magnetic anomalies are a product of a number of

factors including distance, depth and orientation to the object from the sensor, speed of the survey vessel, and mass of the detected ferrous material. The Reader's Point and Terence Bay vessels were located in sheltered coves. The vessels were contained in low energy environments. Sediment deposits formed around the vessels and eventually filled all exposed voids. In this environment, the limited number of iron drift pins and nails produced a low magnetic signature (Watts 1994:33). In Beaufort Inlet, the prospect of *Adventure* being intact is improbable. The amount of ferrous material used in the sloop's construction would be negligible. The lack of a magnetic signature associated with keel timbers, frames, and other ship features suggests that a scattered, disarticulated wreck might not be detectable by magnetic survey techniques. Identifying ship features will rely on the side-scan sonar should elements be exposed on the inlet's floor.

Material assemblages from *Queen Anne's Revenge* and *Whydah* wrecks

Through the study and diagnostic examination of artifacts from a particular period or society, archaeologists gain insight into the values, ideals, and attitudes from past cultures. " The common assumption underlying material culture research is that objects made or modified by humans, consciously or unconsciously, directly or indirectly, reflect the belief patterns of individuals who made, commissioned, purchased, or used them, and by extension, the belief patterns of the larger society of which they are part" (Schlereth 1981:3). To make predictions about what may remain of *Adventure,* it is necessary to review the material culture and artifact assemblage from period ships.

Fortunately, two contemporary vessels exist, the *Whydah Galley* and *Queen Anne's Revenge*. The study of material culture does not only supply us with time frames, manufacturing methods, and makers' marks, but provides a glimpse inside a society from our past. By comparing artifacts from these two vessels, it may be possible to learn

something of the trading circle the pirates sailed, hierarchy among the crew, job specialization, foodways, and leisure activities. Although the ships were considerably larger than *Adventure*, artifacts recovered represent items anticipated on a 1710-1720 pirate vessel or privateer and in combination with any ship features recovered, may help date the wreck.

The reason for studying *Whydah Galley* and *Queen Anne's Revenge* is that both vessels were involved in piracy. Pirates represent a social and cultural sub-class within the greater realm of seamen. Pirates had no nation, they were widely dispersed, and their community had no geographical boundaries. The egalitarian form of social order extended into their daily lives. Sailors on board a pirate ship made choices that did not exist for contemporary sailors on merchant ships or naval vessels of that time. They elected their captains and quartermaster, divided their prize money into shares, and consulted collectively and democratically (Rediker 1987:286). Some pirates realized aspirations, achieved financial gain and a sense of freedom during a time when only a small segment of society was allowed to do so. Although much has been written on the subject of piracy, new insight into the lives of pirates awaits the analysis of material culture recovered from their vessels.

Queen Anne's Revenge (*QAR*), Blackbeard's flagship lost near Beaufort Inlet the same day as *Adventure,* is believed to have been a 300-ton, 100 foot long French slaver. *QAR* started her career as a successful slave trader out of Nantes, France. *QAR* ran aground, either by malice or mishap, and was consumed by the dynamic environment on a sand bar off Beaufort (Old Topsail) Inlet. Although the wrecking process was sudden, it is believed the crew had time to remove most valuable and personal items the ship carried. The limited excavation of *QAR*, from 1997 to 2000, produced over 2,000 artifacts.

The pirate ship *Whydah Galley*, Captain Sam Bellamy's flagship, is believed to be a 300-ton, 100 foot long vessel lost in a 1717 storm off Wellfleet, Massachusetts, leaving only two known survivors. Removal of any valuable and personal items by the crew was impossible. *Whydah Galley* broke-up along an occupied shore and locals salvaged anything that came ashore after the storm. Archaeologists on the *Whydah* site have recovered more than 100,000 artifacts.

The disproportionate number of *Whydah* artifacts as compared to *QAR* can be explained in several ways. First was the amount of money available for the recovery. The *Whydah* Project, underwritten by a group of financial investors, allowed an extended field season on the wreck and the hiring of many personnel. The *QAR* Project is state funded, allowing only a limited number of weeks per year on site. The *Whydah* Project incorporated into their excavation plan the use of mail boxes, a propeller deflection device that blows holes in the sediment uncovering large quantities of artifacts. The *QAR* Project used only water induction dredges and air lifts, making the work much more time consuming. The *Whydah* Project had an established conservation facility to handle the recovered artifacts. The *QAR* Project used what was effectively a two-car garage as its initial conservation facility capable of handling only a small number of artifacts at a time.

There are discrepancies on the exact number of artifacts recovered and how they were recorded at the *Whydah* excavation. According to Ken Kinkor, project historian for the *Whydah* Project, "At first, all of the individual artifacts were recorded as a single item. Later in the project, multiple items of the same artifact type (nails, gun shot, tacks, etc.) recorded within a square foot space were counted as a single item." (Kinkor, personal communication, November 2001).

Both *Whydah Galley* and *QAR* were similar in size, both were previously employed in the African slave trade, and both ended their careers as pirate ships. Both

ships, given the time period, probably sailed the same areas of colonial America and the West Indies and engaged in similar activities. Different wrecking processes can be postulated because one ship saved valuable items as well as small arms and weapons, while the *Whydah Galley* was lost in a storm. Environmental conditions affecting these wrecks appear very similar, as both are in zones of high tidal fluctuations.

Adventure, although much smaller than *QAR* or *Whydah*, is believed to have been 80 tons and 50 foot in length. After conversion to a pirate ship, it would have carried items similar to those found on *Whydah Galley* and *QAR*. There may have been sufficient time for valuable and personal items to be removed from *Adventure*.

The purpose of this analysis is to be able, when found, to identify *Adventure* through the material culture. The artifact assemblage recovered from *QAR* and the *Whydah Galley* reflects many aspects of early eighteenth-century maritime culture. Many items recovered to date are not exclusive to pirate vessels. Similar objects would have been found aboard contemporary merchant ships, warships, and privateers. The spatial distribution of artifacts on the wreck sites is just as important as the objects themselves. Patterning can provide further insight about the vessel.

To compare artifacts recovered from the *QAR* and *Whydah*, the artifacts have been broken down into six basic classes. These areas include shipboard activities, arms and armament, galley artifacts, cargo, personal effects, ship architecture and components. These classes are based on artifact association; artifacts that would normally exist together, either through its habitat, association, or ecological relationship. Each class has been sub-divided, allowing for like items to be classed together within a larger class. The comparison will include like items found on both sites. Artifact comparison will be qualitative rather than quantitative, paying particular attention to similar items, not their number, because of the larger number of artifacts recovered from *Whydah* than *Queen*

Anne's Revenge.

Shipboard Activities

Ship activities are divided into five sub-classes: weights, carpentry tools, other hand tools, manufacturing instruments, and navigational instruments. Artifacts within this group provide information about job specialization on board. Altering and maintaining *Whydah* and *QAR* took special tools and skills. Woodworking, ships carpentry, and metal work (smithing) took specialized knowledge. Individuals most often taken aboard pirate vessels were ships carpenters and other individuals with special skills (Hamilton 1992:220). Tools required to perform their work include adzes, awls, axes, caulking irons, chisels, files, hammers, mauls, plum, pry bar, and braces (Figure 4.8). These tools were as essential to a ship as navigational instruments.

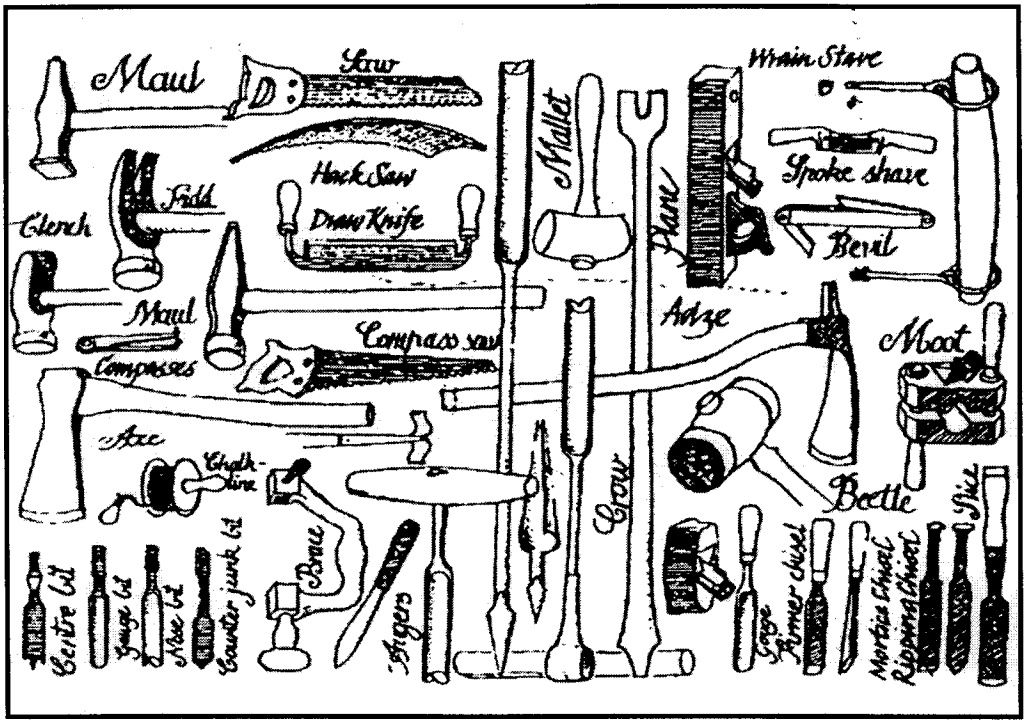

Figure 4.8. Eighteenth-century shipwrights tools (Dodds and Moore1984:42).

The *Whydah* site yielded ten carpenters tools; none came from *QAR*. The reason for the lack of artifacts on the *QAR* site, as speculated earlier, is that the crew had time to remove important articles from the ship, and carpentry tools certainly fall into that category. The carpentry tools found on *Whydah* were located in the bow.

Weights had a variety of uses aboard an eighteenth-century ship. Lead weights were used as fishing net weights, counter-balances for scales, plumb bobs for surveying instruments and most typically, for sounding. A sounding weight 43cm in length engraved 'XXI' (weight 21 lbs.) was one of the first items found on the *QAR* site (Figure 4.9). This instrument would have been attached to a line used to determine water depth and bottom consistency. The sounding weight, along with two smaller weights (397 g and 539 g) had hollowed bases, originally filled with tallow to capture bottom sediment. The *Whydah* site produced four crudely cast large weights, ranging from 28cm and 40 cm in length. A sounding weight engraved 'XX' (20 lbs.), shows similar design and base adaptation (Figure 4.10). Smaller weights were found on the *Whydah*, possibly as measures for a scale used by the quartermaster for the division of coins, jewelry, and other items insuring proper crew shares.

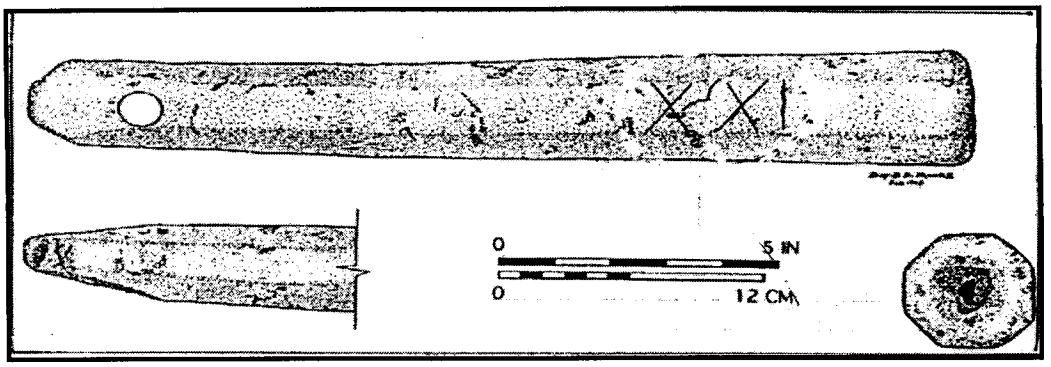

Figure 4.9. Sounding weights *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99).

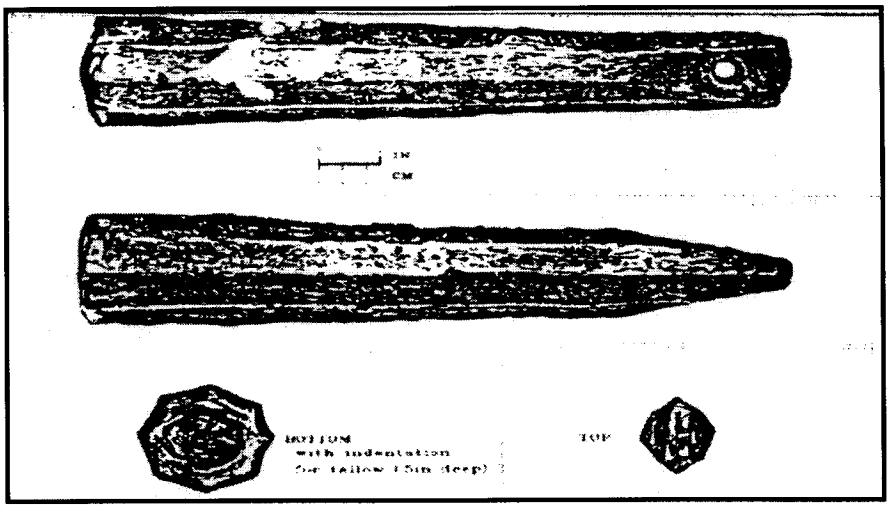

Figure 4.10. Sounding weight *Whydah Galley* (Hamilton 1992:223).

Navigational instruments from the *Whydah* and *QAR* include brass dividers and a brass sector. The *Whydah* excavation also yielded a ring dial, which was used in conjunction with a compass to ascertain time of day (Hamilton 1992:220). Dividers are identified by slots or holes on the tips of one or both of their legs for inserting iron nibs or points. The divider was used to measure off scales, distances, or divide into equal parts (Hambly 1988:45). The *QAR* dividers are the same size as those found on the *Whydah*, having a length of 4.2 in. (Figure 4.11).

Sectors are measuring instruments with graduated legs hinged on one end. Sectors are used in performing a wide range of calculations graphically, the results being measured by dividers (Hamilton 1992:222). Two brass sectors were found on the

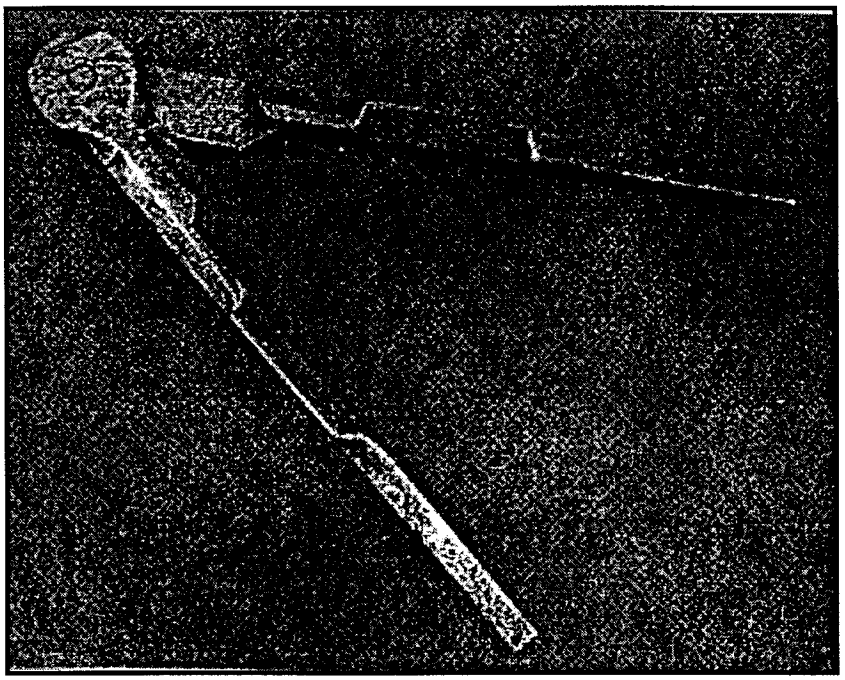

Figure 4.11. Brass dividers *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99).

Whydah. The first brass sectors recovered from *Whydah* were in excellent condition (Figure 4.12) while the second set was sand blasted smooth.

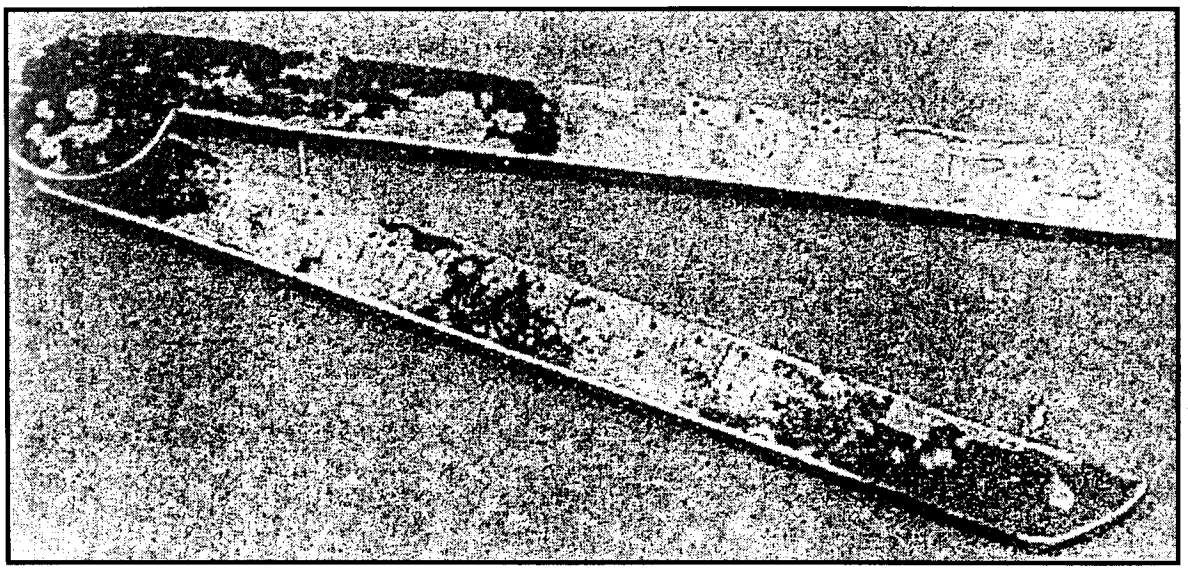

Figure 4.12. Brass sector *Whydah Galley* (Hamilton 1992:222).

The brass sector recovered from the *QAR* (129mm closed, 238mm open) (Figure 4.13) features two logarithmically scaled arms joined at the hinge. Damage to the sector found on *QAR* most closely matches the second set of dividers recovered from *Whydah.* The variety of navigational tools shows both expertise and a working knowledge of sailing in the eighteenth-century. These tools were used by experienced seamen, possibly the ship officers. The instruments were located in the stern section of both vessels where the officers would have been quartered.

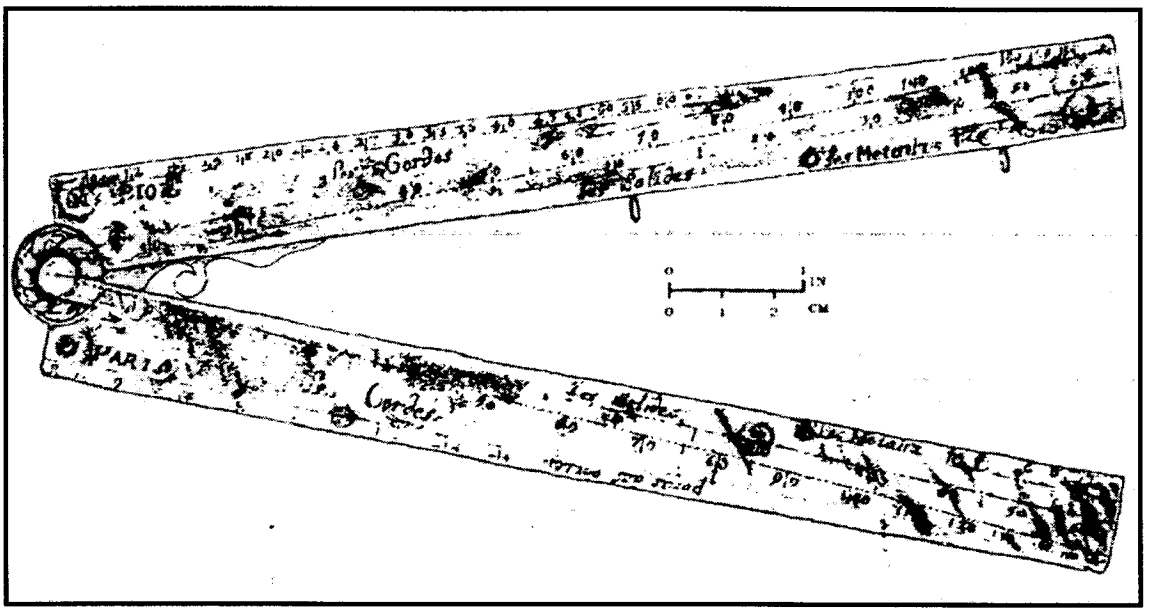

Figure 4.13. Brass sector *QAR* (Wilde-Ramsing *QAR* Artifacts:9/99).

Artifacts in this class anticipated from *Adventure* include navigational instruments, carpentry tool, and sounding weights. The presence of navigational instruments and carpentry tools depends on the time the crew had to collect these valuable items. It is also possible these items would be considered excess items, as each ship would have carried similar items. Sounding weights could easily be replaced and should be found aboard *Adventure*.

Arms and Armament

This class is broken down into five sub-classes, ammunition, small arms, cannon, blade weapons, and grenades. Four categories will be used for comparative analysis because the *QAR* site has yielded no blade weapons to date. Ammunition is sub-divided into cannon and small arms ammunition. Cannon ammunition (Figure 4.14) from *Whydah* consists of round shot ranging from 1-4 lbs., bag shot, bar shot, expanding bar shot, hammer shot, and dumbbell shot.

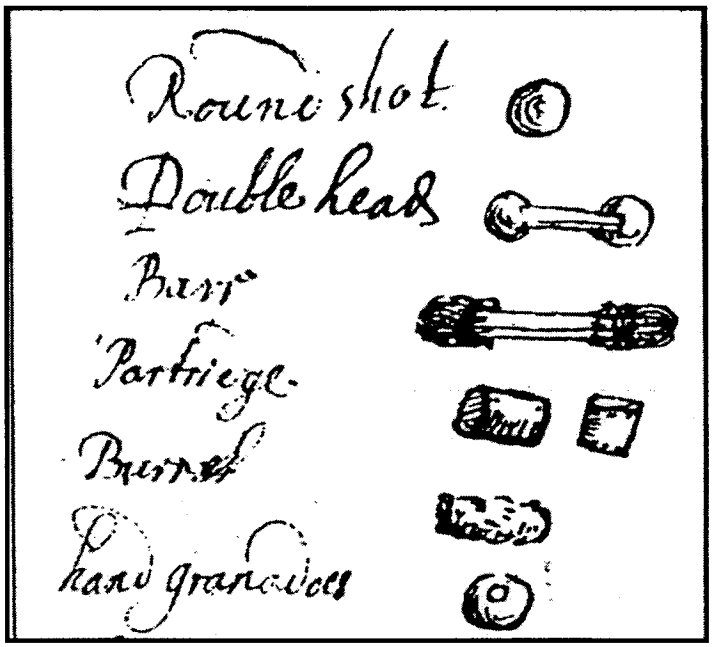

Figure 4.14. Examples of cannon shot (Lavery 1984:159).

Each shot type had a specific purpose, serving as anti-ship, anti-personnel, or anti-rigging. The intent of pirates was not to destroy their prize, but to disable her and the crew to take whatever valuable goods she carried. It appears that pirate vessels carried a

disproportional amount of bar and bag shot vs. round shot (Hamilton 1992:236), denoting the presence of shot varieties intended to disable a vessel and her personnel. The *QAR* had 1,2,3,and 6 pound shot, bar shot, and bag shot, which included glass and iron fragments. It should be noted that iron shot recovered from the underwater environment will lose approximately 15% - 50% of its weight due to graphitization and other corrosion processes. It is necessary to take the effect of corrosion into consideration when estimating the actual weight of the shot recovered (Hamilton 1992:236). Round shot recovered from both sites has circular casting scars and seam lines. Three *Whydah* round shot have a distinctive English Broad Arrow mark (Figure 4.15). *Whydah* bag shot consists of 1-pound cast iron balls sewn tightly into hemp bags. *QAR* bag shot had smaller lead shot, combined with glass and iron fragments.

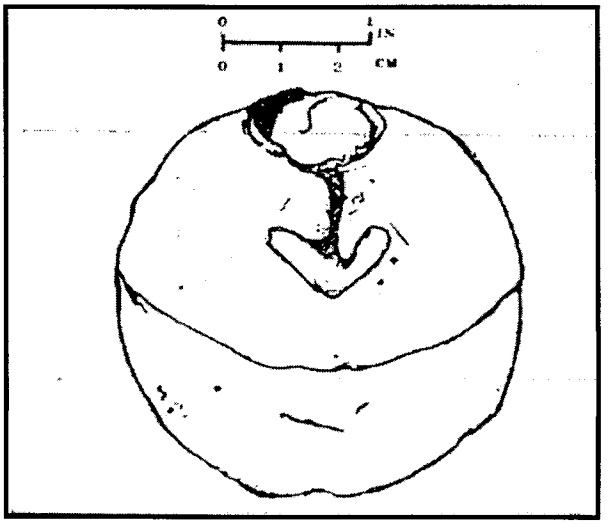

Figure 4.15. Round shot w/Broad Arrow mark (Hamilton 1992:237).

The *QAR* small arms and components are represented by a blunderbuss barrel

with a London proof mark dating between 1672-1702 (Hawtry Gyngell 1959:11), a brass side plate in the form of a sea serpent (Figure 4.16), a brass butt plate, and what appears to be a makeshift copper trigger guard. Many small arms parts recovered from the *Whydah* compare closely with those recovered from the *QAR*. Pistols recovered from *Whydah* had silk ribbons attached to their grips. This indicates either a method for attaching the weapon to one's clothing or for improving the grip of the pistol. The pistols were found in the wreck's stern section. The *QAR* brass side plate closely resembles the *Whydah* serpentine side plate (Figure 4.17). Since this was left behind on the *QAR,* it may indicate the weapon was disassembled.

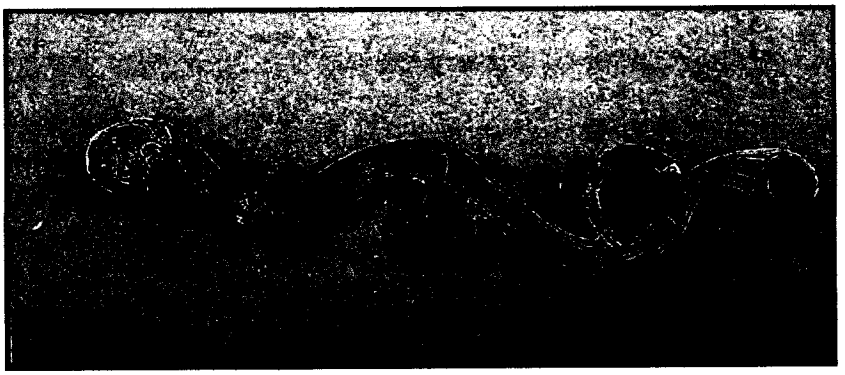

Figure 4.16. Side plate from *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99).

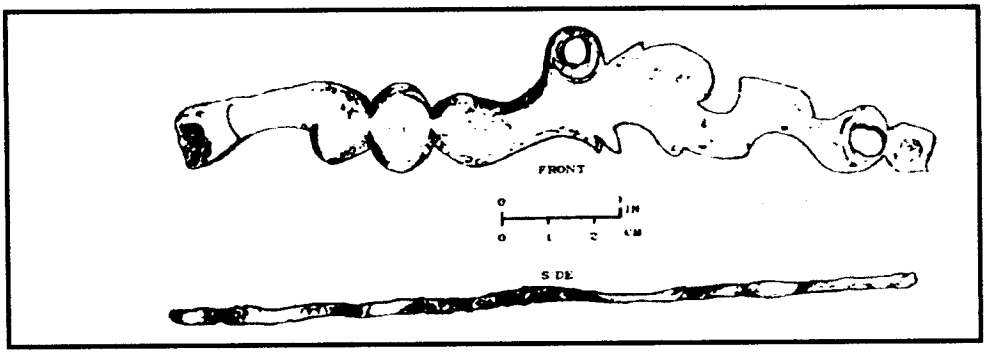

Figure 4.17. Side plate from musket *Whydah Galley* (Hamilton 1992:258).

QAR lead shot recovered came in a wide variety of calibers usable in muskets, pistols, blunderbusses, or bagged and fired from cannon. Lead shot was manufactured in two different ways. The larger caliber shot (.30 -.71 inch diameter) was produced using a two-part mold that left a distinctive seam scar and a casting sprue on the ball. The smaller shot, or "bird shot" (.06-.29 inch diameter), was often produced by pouring molten lead through a brass colander that allowed lead droplets to fall about one foot into a container of water. This method, first publicized by Prince Rupert in 1665, is indicated by slightly ovoid-shaped shot with small dimples in the flattened faces (Baird 1973:83-85). Both shot-manufacturing methods are present among *Whydah* and *QAR* artifacts.

Cannon represent a significant example of altering a ship's architecture to improve its fighting quality. When a merchant vessel, *Whydah* reportedly had eighteen cannon on board. Based on depositions given by pirates captured from Whydah's consort vessel, twenty-eight to thirty cannon were on board at the time of the wreck. Cyprian Southack recovered two cannon shortly after the wreck and later sold them in Boston. At least one cannon remains on site, and twenty-seven cannon have been recovered (Hamilton 1992:269). The recovered cannon include 3, 4, and 6 pounders along with a smaller swivel gun. Some cannon were loaded. Over half the twenty-seven cannon still had tompions in the muzzle. Along with tompions and barrels, cannon aprons and lashes (used for securing the aprons to the barrel), wadding, paper cartridges, and shot were recovered from *Whydah*.

Queen Anne's Revenge carried a total of sixteen cannon when it left Nantes on March 24, 1717. After her capture by Thache November 28, 1717, the pirates added additional cannon, raising the total to forty. Since 1996, a total of twenty-one cannon have been recorded. Some *QAR* cannon were loaded (Figure 4.18). Tompions were present, although most *QAR* tompions were in bad condition. Shot, wadding, and cannon

aprons were also recovered from *QAR*.

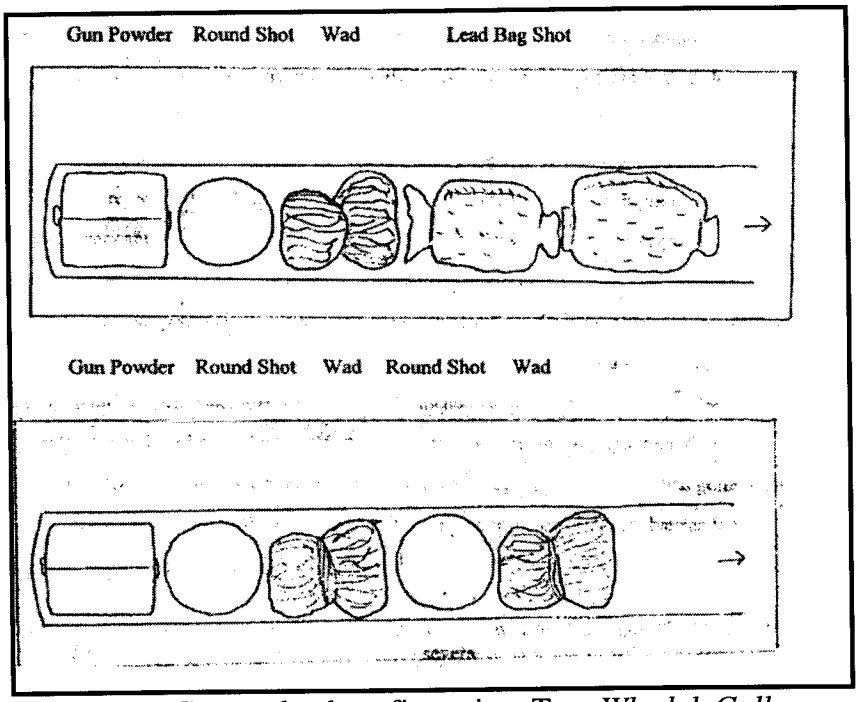

Figure 4.18. Cannon load configuration. Top: *Whydah Galley*, Bottom: *QAR* (Drawing by M. Overfield).

Both wrecks' cannon came from many different countries. Inscriptions on *QAR* cannon indicate they came from England, Spain, France, and Sweden. *Whydah*'s cannon, are a mix of French and English cannon. Both *QAR* and *Whydah* cannon wadding was made from hemp, except for one example made of China grass used in a *QAR* gun. The China grass, literally grass from China, may represent stolen cargo from a trading ship that found its way on to *QAR* (Lusardi, personal conversation, April 2001). Some *QAR* cannon touchholes had wooden plugs, perhaps indicating that they were loaded and ready to fire. Since only twenty-one cannon have been recorded, others may have been saved or salvaged.

Whydah and *QAR* each had hand grenades. Grenades are hollow iron spheres

molded in two parts with a hole for a wooden fuse. Grenades were intended to disconcert and demoralize opponents prior to boarding and were effective against opponents in close quarters (Grey 1971:45-47). The weapon was also effective when attacking ship's personnel who had gone below decks to escape enemy fire on the weather deck. The *Bird Galley*'s crew, in 1719, barricaded themselves: "down into the Steerage... They likewise threw several Grenado-Shells, which burst amongst us so, that 'tis a great wonder several of us were not killed by them, or by their Shot" (Snelgrave 1734:205).

Grenades on the *Whydah* and *QAR* were identical. (Figure 4.19, 4.20) The cast iron shells had seam scars running along the center of the sphere with the sprue location at a right angle to this line. Shell walls are thickest opposite the fuse hole. This may have been to ensure that the grenade fuse would stay uppermost, both when being loaded, as well as upon landing (Muller 1965:90).

A pirate ship was predatory in nature. The goal was to force a victim to surrender while inflicting minimal damage to the vessel. Therefore pirates limited the role of large cannon shot and incorporated anti-personnel weapons. The recovery of both a disproportionate number of grenades and a wide variety of anti-personnel shot, and cannon may mark a distinction between naval or merchant vessel and a pirate ship.

Adventure is reported to have carried between eight and ten cannon at the time of her wrecking. Cannon are expected in a variety of sizes and origins in keeping with those discovered on *Whydah* and *QAR* , ranging in size from 1 pounder swivel guns to 6 pounder cannon. Armaments found should include grenades or grenade fragments and shot in a variety of sizes. As a magnetic anomaly, cannon would produce a sizable magnetic signature depending on quantity and depth of burial.

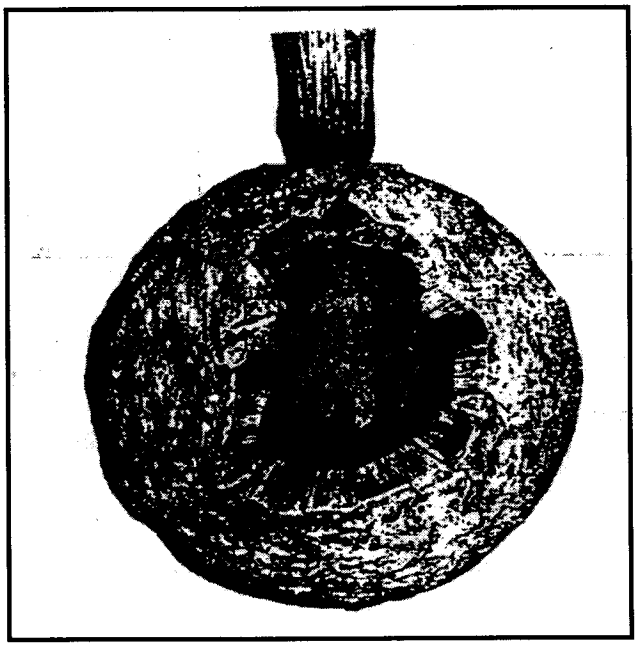

Figure 4.19. Cast iron grenade *Whydah Galley* (Hamilton 1992:288).

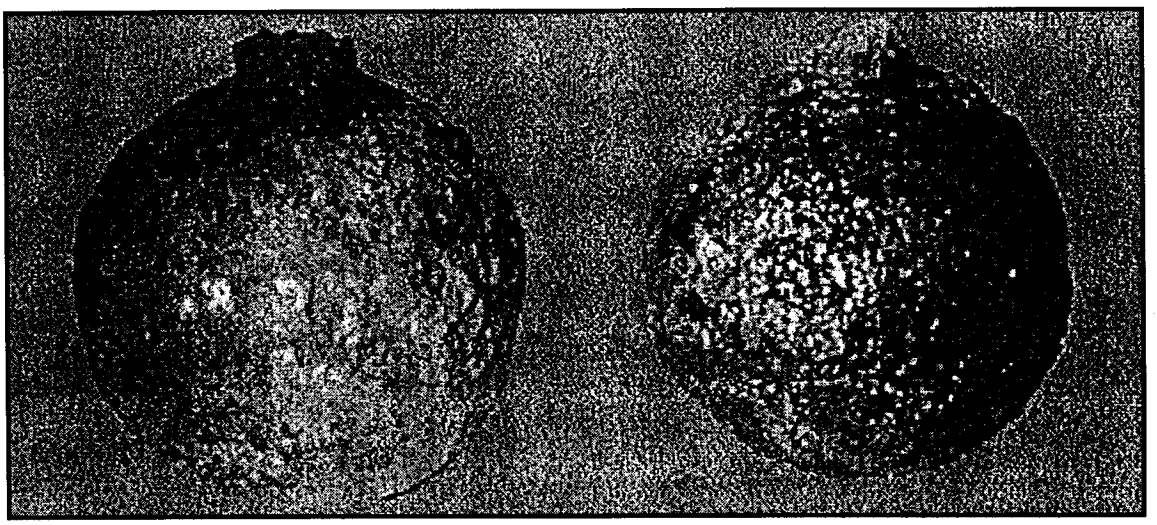

Figure 4.20. Cast iron grenade *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99).

Galley Artifacts

Galley artifacts are associated with cooking, serving, drinking, and eating. Five similar items were recovered from the two sites, including bottles, bottle stoppers, pewter plates, spoons, and bone fragments. The *Whydah* yielded additional items including a pewter teapot, kettle rivets, bowls, forks, and firebrick. Bottles, pewter plates, and spoons are discussed below.

Two intact green glass onion bottles were found along with several necks and bases from similar bottles on *QAR*. The bottles closely resemble those dated to 1710. *Whydah* has similar bottles that more closely resemble bottles from 1714 (Figure 4.21).

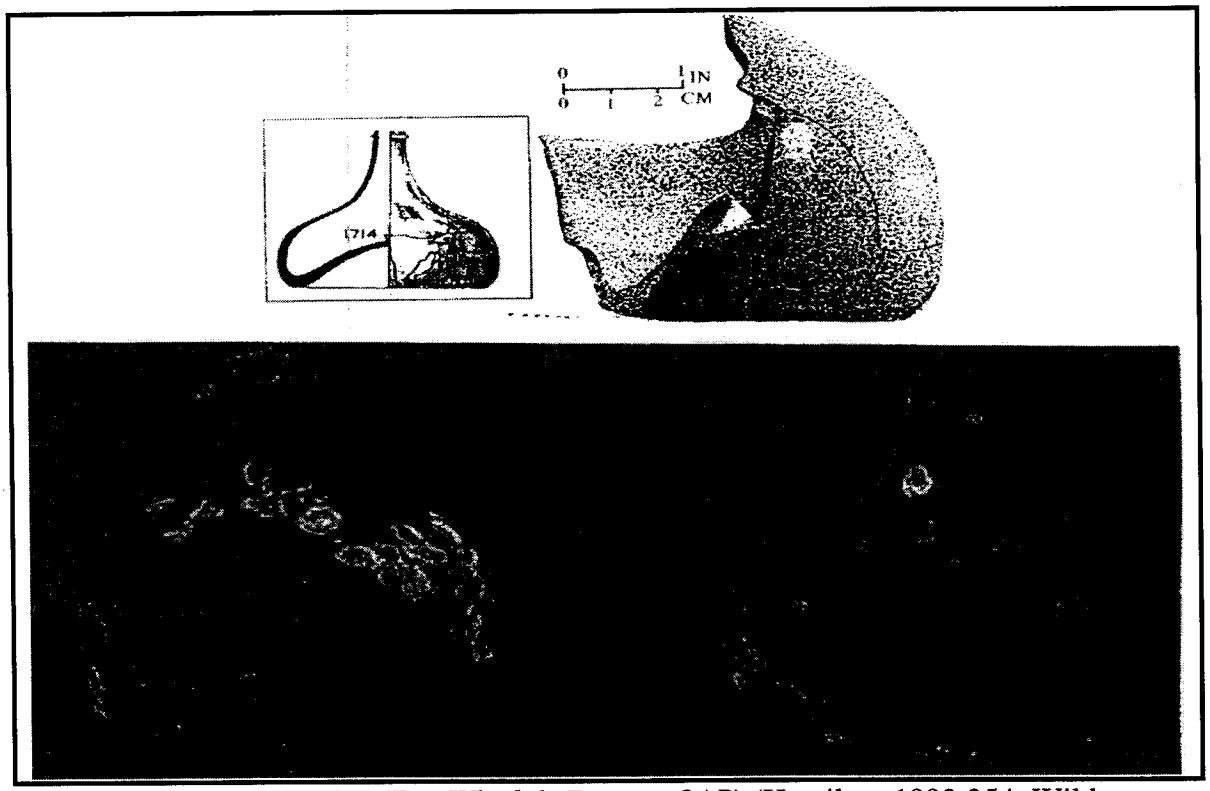

Figure 4.21. Onion bottles (Top *Whydah*, Bottom *QAR*) (Hamilton 1992:354; Wilde-Ramsing *QAR* Artifacts: 9/99).

Pewter is an alloy of tin and lead, with other metals such as copper and antimony added to produce hardness (Masse 1971:51). Pure tin is a soft, malleable whitish gray,

extremely brittle metal. It does not flow properly in casting and is difficult to work with. The problem was solved by alloying the tin with other metals, such as lead, copper, and antimony, to make pewter (Hoyt 1985:12). To ensure finer pewter, a proper proportion of tin to copper was used; 112 pounds of tin to 26 pounds of copper. Common pewter was made of 83 parts tin to 17 parts antimony or lead (Masse1971:5-1). As pewter evolved, so did the desire to standardize pewter alloys in England.

The London Ordinances of 1348 set up two standard alloys. One was "fine pewter," pure tin with a mixture of as much brass as would alloy (Cotterell 1985:5). This was known as "plate metal" from which hard rigid objects, such as dishes, platters, and chargers were made. The second pewter alloy was comprised of 100 pounds of tin to 26 pounds of lead (Cotterell 1985:5). This softer pewter was used to manufacture pots, candlesticks, and other "hollow" pewter wares (Hoyt 1985:14).

Eight pewter plates recovered from *Whydah* range from 20.6 cm to 23.9 cm in diameter. Five plates had visible scratch marks indicating they were used. All but two plates had John Robyns, crown over rose, a Penzance makers mark. The mark measures 2.7cm x 2.0cm and is centered on the plate back. The Tudor rose and crown emblems are British (Cotterell 1972:4). When the initials appear in the crown, or on the heart of the rose, the makers are Belgian, Dutch, French, German, or Swiss (Cotterell 1972:4).

Three large pewter chargers (57 cm in diameter), two smaller chargers (43 cm in diameter), and two pewter plates (24 cm in diameter) were recovered from *QAR*. Two additional plates remain attached to one cannon still on site. Most chargers and plates feature hallmarks on their upper rims or bases that identify the maker and give the pewter an official appearance (Kerfoot 1924:188-189). Pewter recovered from *QAR*, some with remnants and impressions of fabric on their surfaces, suggest these items were stored, possibly for use as trade items, and not used in everyday food consumption.

The pewter plates feature base marks including the word London, a London and Tudor Rose secondary mark, the printed name of [Geo]rge Hamm[ond] and his mark, a flexed arm wielding a sword. Hammond worked in London as early as 1693, and was made steward of the Worshipful Company of Pewterers in 1709 (Cotterell 1985:225). The mark and name of John Stiles (IO. Stile within a sunken cartouche) appears on the bottom of one pewter charger (Figure 4.22). The word London is stamped nearby, as is Stiles' name above a feathered crest bracketing a bird holding a snake. Three hallmarks (a rampant lion, an eagle, and an unidentified mark) are stamped on the base of the charger (Lusardi 2000:65). Stiles produced pewter ware in London from 1689 until at least 1730 (Cotterell 985:315).

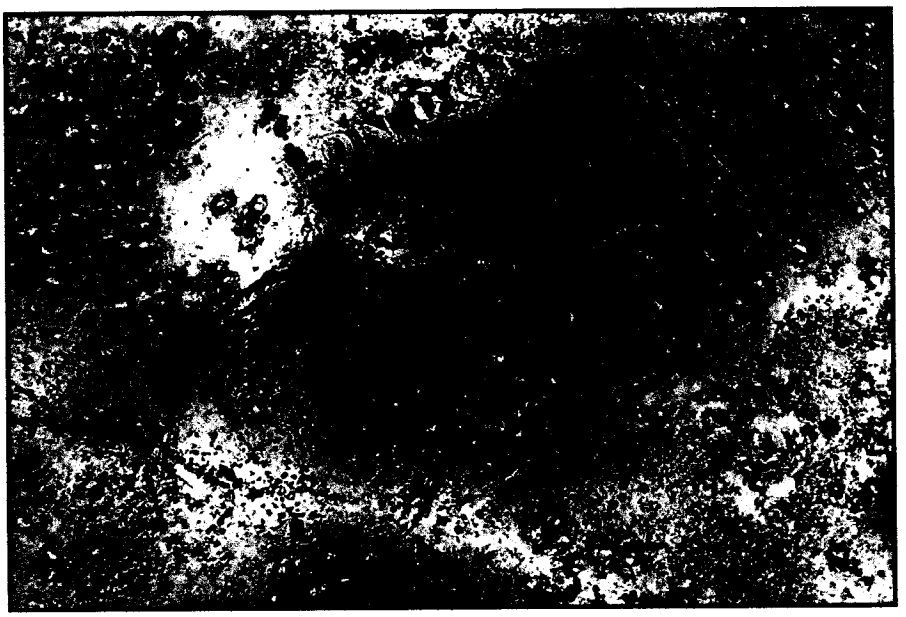

Figure 4.22. Pewter hallmarks from *QAR* (Lusardi 2000:65).

Whydah yielded six pewter spoons. Three spoons are in the wavy end style (1700-1730), two spoons are round end style (1710-1730). Two spoons had a small hole bored into the end of the rat-tail, apparently for the purpose of hanging the utensil. There are no

distinguishable makers' marks present, with the exception of an X stamped inside two spoon bowls. This X is a quality mark used on English pewter after 1690 to denote fine quality pewter (Hoyt 1985:37). Two spoons had initials roughly scratched into the flat back of the spoon stems, possibly indicating the owner. Partial remains of a single spoon were recovered from *QAR*. The spoon was concreted with a wooden box. There are no distinguishable marks present and the end is not drilled out. Although the spoon's stem has a flat bottom and rounded top, similar to a wavy end spoon, this artifact is too deteriorated to identify.

Until the mid-seventeenth century, spoons were made of second grade pewter. In 1667, an effort was made to upgrade the quality of spoons. The Pewterers Court announced that spoon makers were to use "plate metal" or fine pewter (Hoyt 1985:18). Two years later, spoons were once again ordered made of "lay metal," then, eight years later, the court once again ordered spoons were made of "fine metal" (Hoyt 1985:18).

Date	Name	Stem Length	Bowl Shape
1660-1699	Early Round End	Short	Egg Shaped
1700-1730	Wavy End	Long, Round	Deep and Narrow
1710-1730	Round End	Long, Flat	Egg Shaped

Table 1. The earliest rat-tail spoon late seventeenth and early eighteenth century.

Molds for casting spoons were made of stone, clay, wood, or bronze (Hoyt 1985:18). Bronze molds were more durable and could be heated many times without deteriorating. The Pewterer Company listed bronze molds as early as the fifteenth century (Hoyt 1985:20). Spoons were made by pouring molten pewter into a cold mold. After a few minutes, the pewter solidified enough to be removed from the mold. The mold was

quickly opened; the half retaining the object would be plunged into a bucket of water. The edge of the mold was then tapped to remove the spoon for air-cooling (Hoyt 1985:23).

After casting, spoon bowls were hammered to harden and compact the metal and make them strong enough for daily use (Hoyt 1985:23). The spoons were later scraped and polished to give the entire surface a bright appearance (Hoyt 1985:25). Around 1660, a trend emerged of pewterers placing two or three touch marks on the back of the stems and by 1680, all makers marks were on the back of the stems (Hoyt 1985:37).

A number of ceramic fragments were recovered from *QAR*. These fragments were tin-glazed red-bodied faience, salt glazed stoneware, and red and cream bodied earthenware jar fragments. This may indicate the crew was eating from ceramic wares as opposed to the use of pewter on *Whydah.*

It is anticipated that *Adventure* would have both ceramic and glass onion bottles remaining on board. Wooden trenchers were the table service of the day for sailors during the eighteenth century, however, ceramic dishes that may have been used as trade items or dining pieces by the crew or senior officer of the ship, would not be considered out of place. Glass onion bottles were used for a variety of purposes and may provide dating information should *Adventure* be discovered. The presence of spoons and pewter ware could be anticipated should the wreck be contained in one area and would also provide dating information for the site. A magnetic signature is trapped inside ceramic when fired. A magnetometer may be able to pick up this thermoremnant signature depending upon the amount of ceramic contained in one area and the depth of burial.

Personal Effects

Very few personal effects were recovered from *QAR*, supporting the assumption the crew had time to remove valuables. Over 323 items including buckles, buttons, cufflinks, rings, and gaming pieces have been recovered from *Whydah*. Gaming pieces recovered from the *Whydah* were found throughout the ship indicating that all crew members participated in this leisure activity. Pipe fragments were located in the bow sections of both vessels, indicating that smoking was probably restricted to this area.

Clay pipes were used extensively in the eighteenth century as both trade and personal possessions among ships' crewmembers, in colonial settlements, and in the European homeland. Clay tobacco pipes changed forms markedly in the seventeenth and eighteenth century (Figure 4.23). Clay pipes were often manufactured, imported, smoked, and thrown away within a year. Stem length bore a direct relationship to the period of manufacture, starting with six to eight inch pipes in the early seventeenth century and extending to the long church warden pipes of the early eighteenth century. The trend then reversed itself, ending in the short-stem pipes made during the nineteenth century.

Archaeologists frequently recover pipe stems. J.C. Harrington developed a method of dating clay pipes by measuring the pipe stem hole diameters (Figure 4.24). As Harrington put it, "In making use of this dating device, the first requirement is a 39-cent set of drills; the second is common sense" (Thomas 1998:250).

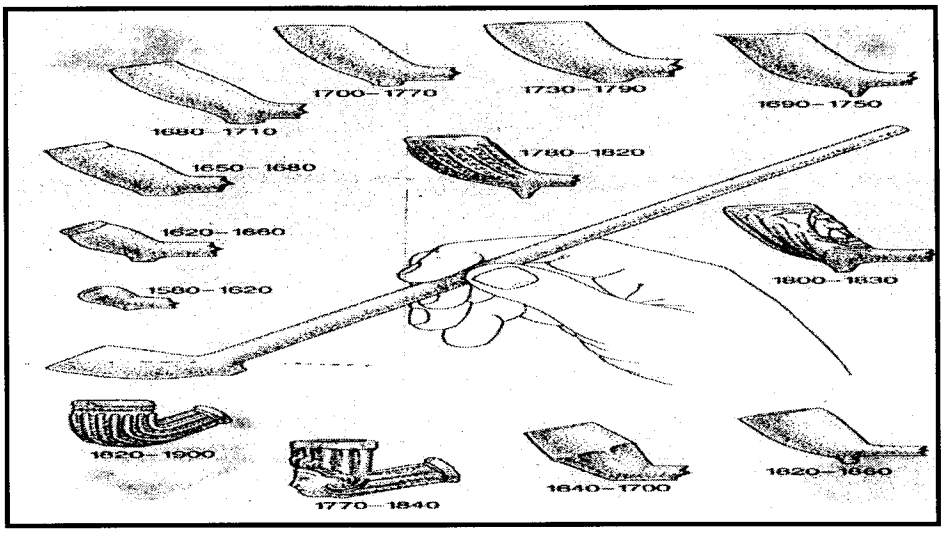

Figure 4.23. Evolutionary sequence of English and American clay pipes (Thomas 1998:249).

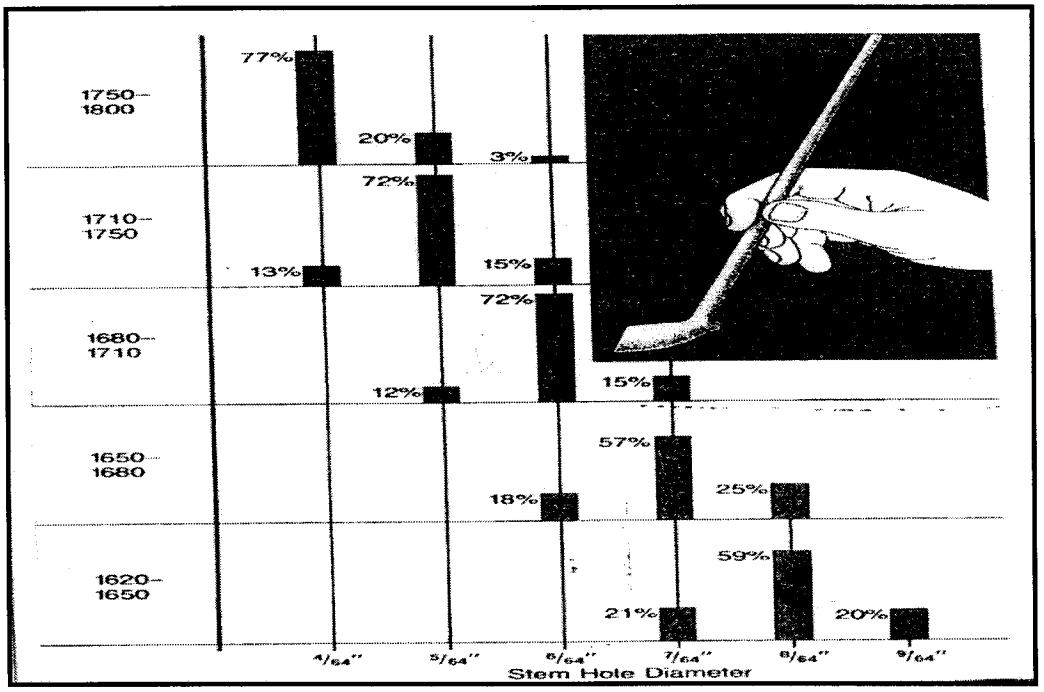

Figure 4.24. J.C. Harrington's seriation diagram for pipe stem dating (Thomas 1998:250).

Seven pipe stems were recovered from *Whydah*. Four bores had diameters measuring 5/64", two were 6/64", and one could not be determined. The four 5/64" pipes fit into the

range of 1710-1750, while the two 6/64" pipe stems fit into the 1680-1710 period. One of the 5/64" stem makers has been identified through its "RT" makers' mark and "R Tippet" cartouche (Figure 4.25).

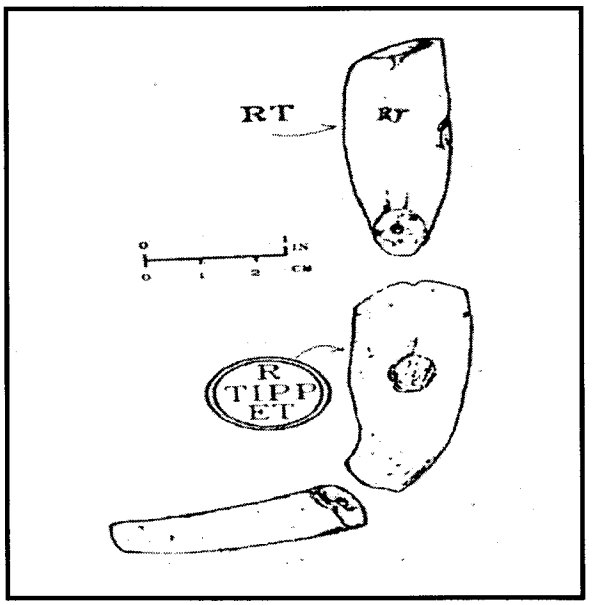

Figure 4.25. RT clay tobacco pipe *Whydah Galley* (Hamilton 1992:391).

The *QAR* pipe stem (Figure 4.26) had a bore diameter of 6/64" (1680-1710). There were no distinguishable makers marks on the stem. The partial bowl attached to the stem indicates a flat base representative of pipes manufactured between 1680-1710 (Thomas 1998:249).

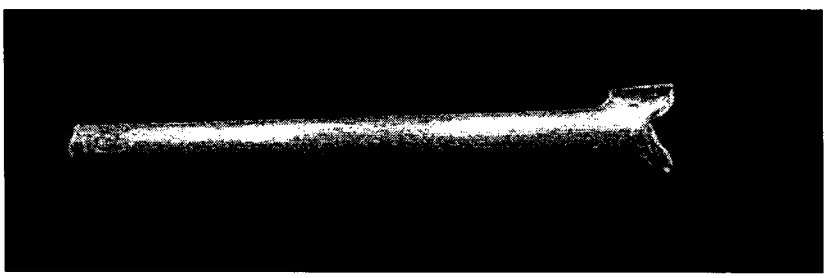

Figure 4.26. Clay pipe stem *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99.

Similar to the wrecks examined, *Adventure* is expected to yield few, if any personal items. Ceramic pipes and pipe fragments seem to have been found in abundance and may appear on the *Adventure*. The benefit to researchers includes both dating and determining the origin of manufacture data, thus providing information about the ship and its travels.

Cargo and Storage

Cargo carried by both vessels at the time of their sinking might include barrels, boxes, and other merchandise intended to be consumed or sold by the crew. These items would have been in the hold. As discussed earlier, most, if not all, valuable and personal items on board *QAR* were probably removed shortly after running aground. *Whydah*, breaking up in a storm close to shore, lost most light items, either by floating away from the site or being salvaged by local citizens shortly after the sinking.

Whydah yielded almost 7,000 coins, 600 gold beads and ornaments, 6,100 bits of gold, barrel staves, and a basket fragment. *QAR* had only a small quantity (2 grams) of gold dust. The barrel hoops recovered from *QAR* appear to be wrought iron. These would have been made either in New England or, more likely, in Europe. The barrels, because of the number of hoops found in association with each other, were probably broken down and in storage for later use.

There are two basic barrel types, tight and slack, and three basic components of a barrel: staves, hoops, and heads. "Tight cooperage" was for liquids such as water, ale, molasses, oil, rum, and wine. Tight casks were generally made of oak, because of the woods' ability to withstand the internal pressures of fermentation and bear the strain of transportation. Oak also provided durability, strength, was water impermeable and left no taste on its contents. Barrel staves, the curved pieces of wood forming the walls of the barrel or cask, were thicker than those found in slack barrels and fit tightly against one

another. The staves were held in place by hoops made of wood or iron. The barrel was closed at the bottom and top by rounded pieces of wood called heads. The heads were held in place by a groove cut into the top and bottom end of the staves.

Slack cooperage was used to hold dry goods such as peas, rice, oatmeal, meat, flour, corn, potatoes, crockery, and tobacco. Slack barrel wood varied because of the less stringent requirements. Red oak, ash, chestnut, beech, fir, and pine were frequently used. The staves were not as tightly fit and were thinner than tight barrels. Because the woods used in their construction were neither as durable nor as water resistant, water damage and breakage during transport frequently occurred.

Straps held the sides of barrels together. These straps were made of ash, hazel, elm, oak, or pine. The straps or hoops kept the barrel from expanding to the point it would leak, and protected the staves from impact during transport. Hoops were generally made from a single piece of split wood joined by overlapping each end and wrapped with two or three pieces of willow binding (Elkington 1984:98).

Whydah barrel hoops were made from species indicating colonial or West Indian manufacture. The staves have the croze (groove) clearly present but the wood type has yet to be identified. The barrel's contents cannot be determined, although it appears that nails were contained in one. Basket fibers recovered on *Whydah*, in close proximity to the barrels, suggest baskets were also used for storage. *Adventure* was participating in the logwood trade at the time of her capture. Unfortunately, it is not known whether she was inbound or outbound from the West Indies. This information may provide a clue to the types of cargo *Adventure* would have carried. Barrels, barrel staves, and hoops, baskets, and storage jars are expected from the site. Place of origin may be narrowed down should wooden barrel straps be located among the remains of the wreck.

Ship Architecture and Components

This class of material culture is the most under-represented of all the classes presented here. *Whydah*'s wrecking processes, ship capsizing, hull breaking, washing ashore, and subsequent burning of wooden remains for iron, left little evidence upon which to base any interpretation about the ship's appearance and function (Hamilton 1992:393). Only a single plank has been recovered from *Whydah*. *QAR* experienced a less violent death, but tidal action over 283 years carried off or buried most ship artifacts. Some hull planking and framing have been recovered from *QAR*. Although there is not enough to adequately reconstruct the vessel's appearance, *QAR*'s approximate length and tonnage may eventually be determined. The iron spikes and drift pins suggest that *QAR* was of European construction. An analysis shows wood types and frame fastening patterns are compatible with French shipbuilding techniques (Roberts 1992:52).

This section deals with ship-related artifacts that may also be found in the wreckage of *Adventure*. These items include anchors, bilge pumps, and wrought iron hooks. Iron fasteners, including nails, tacks, and iron drift pins would not be found in great quantity on the *Adventure* site. Assuming that *Adventure* was of New World construction, possibly from Jamaica or Bermuda, and because of the scant supply of iron in the colonies, treenails would have performed those functions.

Both *Whydah* and *QAR* yielded sections of bilge pumps used to remove water from the ship as well as transporting water from one area of the ship to another for cleaning decks or putting out fires. The bilge pump piston recovered from the *Whydah* is identified as an Elm Tree Pump (Goodwin 1977:84). The piston was cylindrical in shape and wrapped in leather. The leather acted as a seal or gasket. The piston was also clad with iron on its front and back. It is assumed that there were three or four pumps on board *Whydah*. The *QAR* contained a bilge strainer. This was a perforated semi-circular, lead

pump sieve, which prevented debris from entering the pump.

On both sites, a large number of iron nails and brass/lead tacks were found, some within hemp bags. Nails from both sites (Figure 4.27) exhibit square shanks and taper to a point. The nails vary in length from 1.5 to 4 inches and may be indicative of particular functions in ship repair. The tacks, too soft to be hammered, were probably used to decorate upholstery, furniture, japanned boxes, or chests (Hamilton 1992:495).

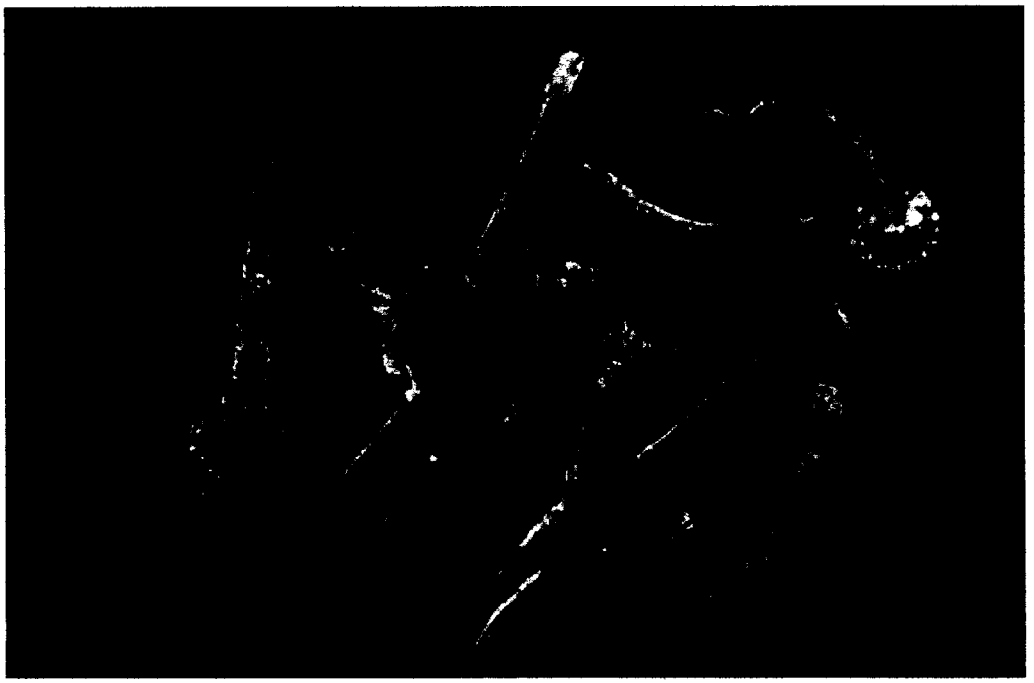

Figure 4.27. Tacks from *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99).

Kedge and bow anchors were recovered from both sites. *QAR* also yielded two stowed anchors and a five-fluke grappling hook. Rigging elements include deadeyes, blocks, and rigging hooks. The wrought iron hook recovered from *QAR* (Figure 4.28) was used for the ship's rigging and tackle, as well as in the manipulation of cargo and heavy ordnance (Lusardi 2000:61).

Figure 4.28. Mould of wrought iron hook *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99).

Bronze bells recovered from both sites led to the identification of one wreck, while contributing marginally to the other. The bell recovered from *QAR* is dated 1709 (Figure 4.29). The bell features the Roman Catholic invocation IHS (Jesus Hominum Salvator) MARIA. This invocation may indicate that the bell was either Spanish or Portuguese in origin. This bell does not identify *QAR* as *Concorde*. It may have been obtained by Thache and his crew, either from a Spanish sloop that was in his company, or recovered by the pirates when they salvaged artifacts from a New Spain fleet wrecked off the east coast of Florida in 1715 (Lee 1974:37). The *Whydah*'s intact bronze bell, iron clapper, and wooden stock with the inscription *The Whydah Galley* (Figure 4.30), clearly identifies the wreck. This find provides a starting point for many artifact interpretations.

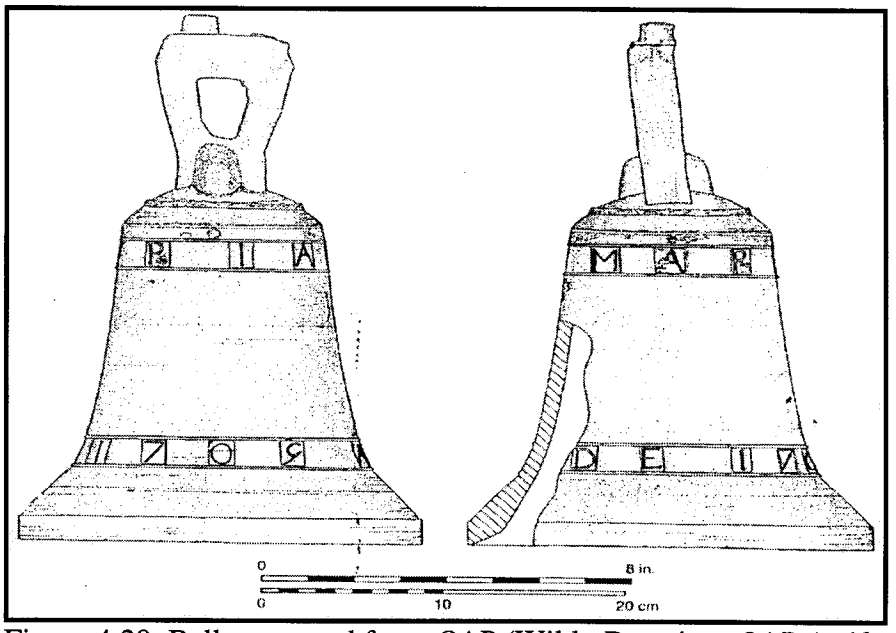

Figure 4.29. Bell recovered from *QAR* (Wilde-Ramsing *QAR* Artifacts: 9/99)

Figure 4.30. Bell recovered from *Whydah Galley* (Clifford 1999:191)

Comparison of the material assemblage recovered from *Whydah Galley* with *Queen Anne's Revenge* (in terms of volume) is inequitable given the time expended for

artifact recovery by the *Whydah* staff. Between 1997 and 2001, the *QAR* Project received less than 1.3 million dollars in funding and grants as compared with over 6 million dollars raised by the *Whydah* Project through public stock offerings.

Chronologically, recovered artifacts compare well to the known period when the ships wrecked. Pewter plates and spoons date to the 1700-1725 era. Ceramics recovered from *QAR* also date to this era. It is interesting to note that pewter plates recovered from *Whydah* show use wear while those from *QAR* did not. Ship architectural remains provide minimal data. There is evidence of the type of wood used in construction and framing methods, but the evidence falls short of providing a complete picture. There is some evidence that vessel modification took place through the use of patches to repair damaged areas.

Some modification appears in the unusually large number of cannon carried aboard each ship. The variety of cannon and their origins indicates that cannon from throughout Europe were used on pirate ships. The large number of anti-personnel weapons indicates each vessel was capable of engaging in close combat without intentionally inflicting major structural damage to target vessels.

Significantly absent from the *QAR* wreck are indications the vessel was used as a slave ship. Shackles or other restraining devices have yet to be recovered. *Whydah*, also involved in the slave trade, had these devices. These items were not valuable personal items that would have been removed by the crew. There are many possibilities that may explain the absence of shackles on *QAR*. Possibilities considered are that only two percent of the wreck has been excavated, and shackles may be discovered in the future, or

shackles may be concreted onto artifacts already recovered, but not yet conserved, or the shackles were used to retain slaves after *Concorde* was captured and remained with the slaves after their sale.

Assumptions and parameters for identification of *Adventure*

The wrecking process that *Adventure* experienced will dictate the amount of archaeological and material culture left behind and effect the magnetic and sonar images associated with them. Based upon the inlet's dynamic environment, two potential scenarios are assumed. The first assumption is *Adventure*, after running aground, was quickly buried beneath soft sediment. This process would slow degradation and leave a portion of the ship's structure intact. Lighter items from the site floated away, but heavier items and items trapped within the hull remain allowing analysis of artifacts' spatial distribution throughout the wreck. Anomaly patterns of buoyant hull wrecks would contain two important magnetic characteristics. First, there would be a linear distribution pattern produced by the remains of the intact hull. In the case of a wooden- hulled vessel, the anomaly pattern may appear as a complex, elongated anomaly, containing areas of high and low magnetic intensity within the boundaries (Gearhart 1988:40). Cannon and anchors would likely produce signatures between 100 and 300 gammas within a highly concentrated area, depending on depth of burial and distance from magnetic source. The long axis of the anomaly pattern should be oriented parallel to the surf line attributable to the tendency of a drifting hull to turn broadside to the waves, depending on the release of the anchor lines at the time of wrecking.

The second assumption is that *Adventure* was broken up prior to burial in

sediment. *Adventure* might have disintegrated with wooden structure scattered upon shore. Heavier items, such as cannon and anchors, would be scattered rather than deposited in one central location. When a ship breaks apart soon after running aground, the potential for anomaly sources, such as iron fittings and magnetic ballast material, to become scattered away from the main body of the wreck is much greater than for a buoyant hull. Waves of sufficient energy to break up a ship might also be expected to distribute vessel elements high onto the beach. At the same time, littoral drift would tend to transport buoyant elements down current. A buoyant hull fracture would therefore consist of a pattern of multiple anomalies (5- 85 gammas), with wreck scatter radiating down current and upslope from an area of more tightly clustered, higher intensity anomalies (Gearhart 1988:41). The process should be distinguishable from that of a buoyant hull due to the horizontal diffusion of the complex, linear anomaly pattern together with a pattern of lower intensity anomalies radiating inland and down current from the source. Search parameters for *Adventure* involved both close-in survey work to reveal scattered wreckage along the shorelines and a broader search throughout the inlet looking for a concentrated target.

Expectations

Material culture expected from *Adventure* includes heavier objects that would not float away or be removed. *Adventure* is reported to have carried between eight and ten cannon at the time of her wrecking. Cannon are expected in a variety of sizes and origins. Armaments should include grenades and lead shot. Anchor, chain, and hooks used for loading and unloading cargo are expected. The quantity of artifacts is expected to be

limited when compared with the *Whydah* and *QAR* based on size variation.

The remains of iron barrel hoops, nails, and tacks may be present, along with galley artifacts, such as broken ceramics and glass bottles, and possibly pewter trade goods. The artifact's spatial distribution patterns should be similar to *QAR.* The most valuable item to help identify *Adventure* would be a ship's bell. *Whydah*'s bell confirmed her identity and completed the story of her place in history. *Adventure's* bell would also support the *QAR's* identity.

The presence of specific diagnostic ship parts: keel, cant framing, composite frames, and wood species are not expected in the initial survey of the inlet. The hull structure would not contain the amount of iron present on *Whydah* or *QAR,* again because of her size or place of construction. Should frames or planking be exposed on *Adventure,* they will have treenails and few iron spikes as the joining elements. The limited amount of ferrous metal involved in eighteenth-century ship construction would produce a small signature (20 gammas or less) when traveling directly above the wreck and degrade the farther the sensor was from the remains. In the event remains of *Adventure* were exposed on the bottom surface, sonar recognition would be possible.

Chapter Five

Field Investigation

The remote sensing survey of Beaufort Inlet was conducted June 4 - June 8, 2000. To facilitate data collection and analysis, the project area was divided into five survey zones (Figure 5.1) based on criteria developed from the historical, archaeological, and comparative analysis presented earlier. The actual field survey covered 87 percent of the permit area. Dredge areas, shallow depths, and strong tidal flows within the inlet hampered the project's ability to penetrate certain areas including the surf line along Bogue Banks' eastern edge, Shackleford Bank's western edge, and the southern area of Bird Shoal.

The magnetic survey results can be illustrated in a number of formats. The formats chosen to display magnetic data include dot matrix (Figure 5.1), line contours, and three-dimensional surface plots (Appendix F). Although it would be simpler to present one format for this data, each format has its advantages and disadvantages. It was determined that data analysis should not rely solely on one method.

During the survey, all potential anomaly sources located within the inlet were recorded. Thirty-seven magnetic anomalies were located in four survey areas. Area five produced no anomalies. Ten targets were located along the southern shore of Radio Island extending toward the northwestern shore of Shackleford Bank (Area 1), eight targets off the northern shore of Bogue Banks (Area 2), sixteen targets southeast of Radio Island (Area 3), and three targets off the northern shore of Shackleford Bank (Area 4). The majority of magnetic contacts were associated with underground cables (identified on NOAA chart 11547) and modern ship debris (modern anchors, chains, weights, etc.). In-depth target data are located in Appendix D.

Forty side-scan images were recorded during the survey. Potential targets were selected on the basis of their straight lines, right angles, geometric shapes, high relief shadows, or other features not found in the natural marine environment. Using time and position data, these targets were compared to the data collected by the magnetometer. (Figure 5.1 and Figure 5.2)

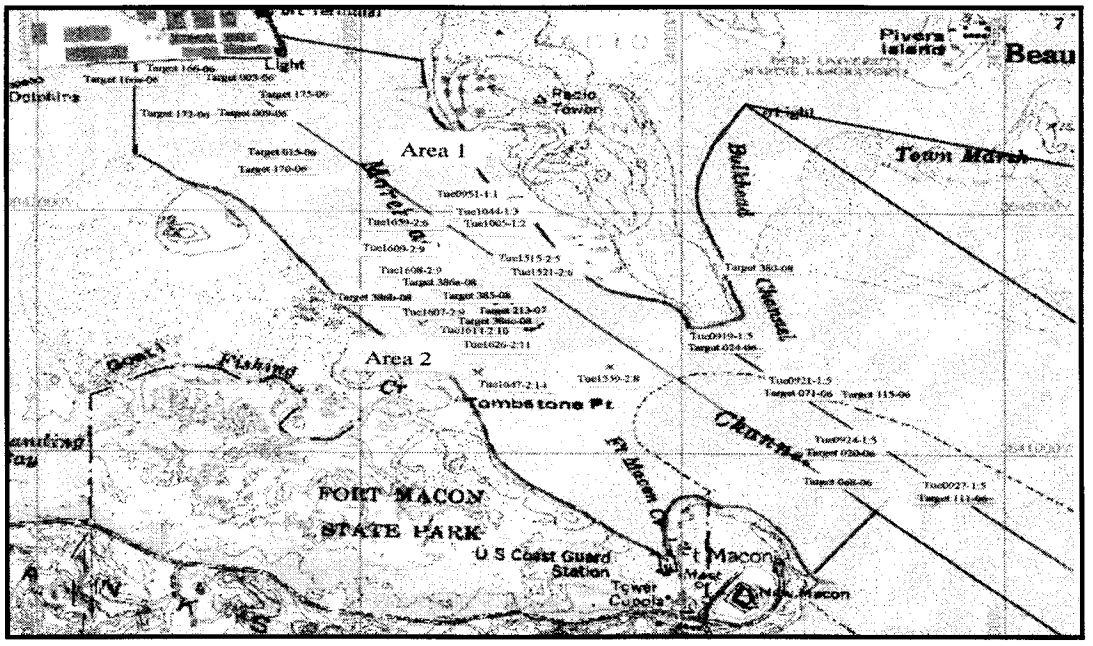

Figure 5.1 Magnetometer and Side-scan targets Areas 1&2.

Description of Findings

Area 1

Ten targets were located along the southern shore of Radio Island and southeast from Radio Island to the northwestern shore of Shackleford Bank (Figure 5.1). All targets in this area are directly associated with cable transects (NOAA chart 11547). An image of this cable is pictured in Figure E.20.

Only one target within search Area 1 appears to represent an anomaly not

associated with the cable. Tues0924-1:5 is a single negative monopolar anomaly with a magnetic signature of 12 gammas and a duration of .58 meters. This target is associated with side-scan sonar Target 020-06 and is unidentified at this time.

Three side-scan images recorded in this area are associated with a cluster of images in Area 2. Target 003-06 (Figure E.1) is a cylindrical shaped object having the appearance of a section of pipe. Target 166-06 (Figure E.11) is a cylindrical return appearing as piling. Target 175-06 (Figure E.14) appears as debris. These images are located within the Morehead City Harbor turning basin. This basin is regularly dredged by the Army Corps of Engineers. The likelihood of any material of cultural significance belonging to a shipwreck in this area is extremely doubtful.

Area 2

Eight magnetic anomalies were recorded in Area 2 (Figure 5.1), located along the northern shore of Bogue Banks. Only three targets are not directly related to known underground cable transects. Tues1607-2.9 represents a dipolar magnetic anomaly with a maximum signal strength of 137 gammas for .9 meters. This target is also associated with four side-scan sonar images (Figures E.35, E.36, and E.21). The images suggest that the magnetic anomaly is associated with broken dredge pipe dumped in this area. One additional side-scan image (Figure E.37) was also recorded at this location, possibly representing a hatch cover or part of a floating dock.

Tues1647-2:14 represents a dipolar anomaly with a maximum reading of 434 gammas lasting for .5 meters. This anomaly presents a signature of high intensity, and short duration consistent with that of an underwater pipe or cable (Breiner 1999:45). This

target may indicate that a cable has shifted from its documented location.

Tues1559-2.8 represents two anomalies. The first is a single negative monopolar anomaly measuring 180 gammas with a duration of 1.7 meters. The second anomaly is dipolar with a maximum of 657 gammas for a duration of 1.2 meters. These two anomalies could be associated with the cable area or a fishing vessel. The high-intensity reading in the second anomaly is representative of an object of significant size at a shallow depth similar to a large anchor or cannon (Breiner 1999:29).

Associated with the side-scan images in Area 1, six images were recorded within the turning basin and the Morehead City Channel. Target 166a-06 (Figure E.10), Target 172-06 (Figure E.13), Target 009-06 (Figure E.2), Target 015-06 (Figure E.3), Target 166-06 (Figure E.11), and Target 170-06 (Figure E.12) display images indicative of scattered debris and probably associated with the dredging process in this area.

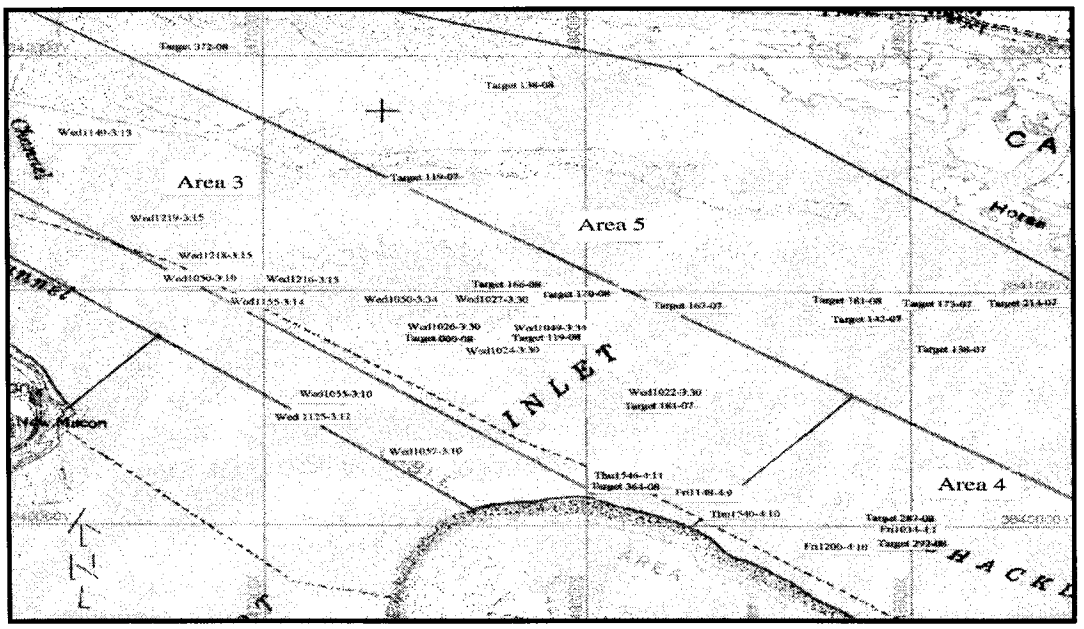

Figure 5.2 Magnetometer and Side-scan targets Areas 3, 4, & 5.

Area 3

Area 3 covers a zone from the northeast side of Radio Island to the northwestern tip of Shackleford Bank (Figure 5.2). Sixteen magnetic anomalies were recorded with nine targets following the documented cable area on NOAA chart 11547. The most prominent feature in this area is a concentration of six anomalies. Wed1050-3:34, Wed1027-3:30, Wed1026-3:30 Wed1049-3:34, and Wed1024-3:30 (Figure D.13, D.14, and D.15) are of medium intensity (11-65 gammas) arranged in a multi-peaked linear pattern. This cluster closely resembles expected magnetometer signatures produced from keel bolts, small iron fittings, and scattered debris associated with the wrecking process. The anomalies are located in relatively shallow water (3-4 feet) within a sandbar that has built up along the northern shore of Shackleford Bank. These anomalies are associated with side-scan sonar Targets 000-08 (Figure E.23), 166-08 (Figure E.26), 170-08 (Figure E.27), 119-08 (Figure E.24), and 181-07 (Figure E.28). The side-scan images feature both round and long linear attributes.

Target Wed1149-3:13 is located on the western edge of Bird Shoal directly east of Radio Island. A single negative dipolar anomaly with a maximum reading of 102 gammas and a duration of 1.15 meters is associated with side-scan Target 380-08 (Figure E.33). The image from the side-scan, recorded two days later, indicates an object of 5.95 meters in length, presenting a long linear image representative of underwater cable.

Area 4

Area 4, located along the northeastern shore of Shackleford Bank presented three magnetic anomalies (Figure 5.2). Two of these anomalies are directly associated with a

known cable. Target Fri1034-4:1 represents a single dipolar anomaly with a maximum reading of 34 gammas and a duration of .5 meters. This anomaly is also associated with two side-scan sonar images. Target 287-08 (Figure E.30) shows two side-scan sonar contacts, both linear in shape. The first contact measures 3.19m long by .43 m wide. The second object measures 2.17m long by.16 m wide. Target 292-08 (Figure E.29) image reflects a cluster of objects that remain unidentifiable.

Area 5

Area 5, located between the southern shore of Bird Island and the northern shore of Shackleford Banks was devoid of magnetic contacts (Figure 5.2). The area produced a cluster of eight side-scan sonar images. Targets 181-.08, 173-07, 214-07, 142-07, and 138-07 images range in size, but appear linear in shape. These images follow the westerly movement of current and may be associated with the cluster discussed in Area 3.
Three isolated side-scan targets are also located within Area 5. Target 119-07 and Target 372-08 are linear in shape and represent pilings. Target 138-07 shows two objects each measuring 4.2m in length and .5 m wide. The uniform size of these objects could represent logs cut for use as pilings. The images may be associated with scattered ship wreckage although no magnetic signatures were associated with these images.

Interpretation of Findings

The magnetometer anomalies and side-scan sonar images collected during the course of the survey were plotted on an area map to assist in the interpretation of the data. As discussed earlier, one key to understanding the processes affecting a wreck site is through understanding environmental factors at work. By incorporating geological and

geographical knowledge of the inlet, it is possible to find areas containing the highest probability for wreckage. Known cable areas allowed many magnetic and side-scan images to be ruled out as possible targets. These anomalies closely aligned on cable areas marked on NOAA chart 11547. Areas of known dredging operations allowed other targets to be ruled out, as these areas are dredged once a year, effectually removing any material.

Data collected from the remote sensing survey indicated four areas that contain magnetometer anomalies and/or sonar images associated with wrecking processes (Figure 5.3). Areas 3 and 5 have the horizontal extension and intensity expected from scattered

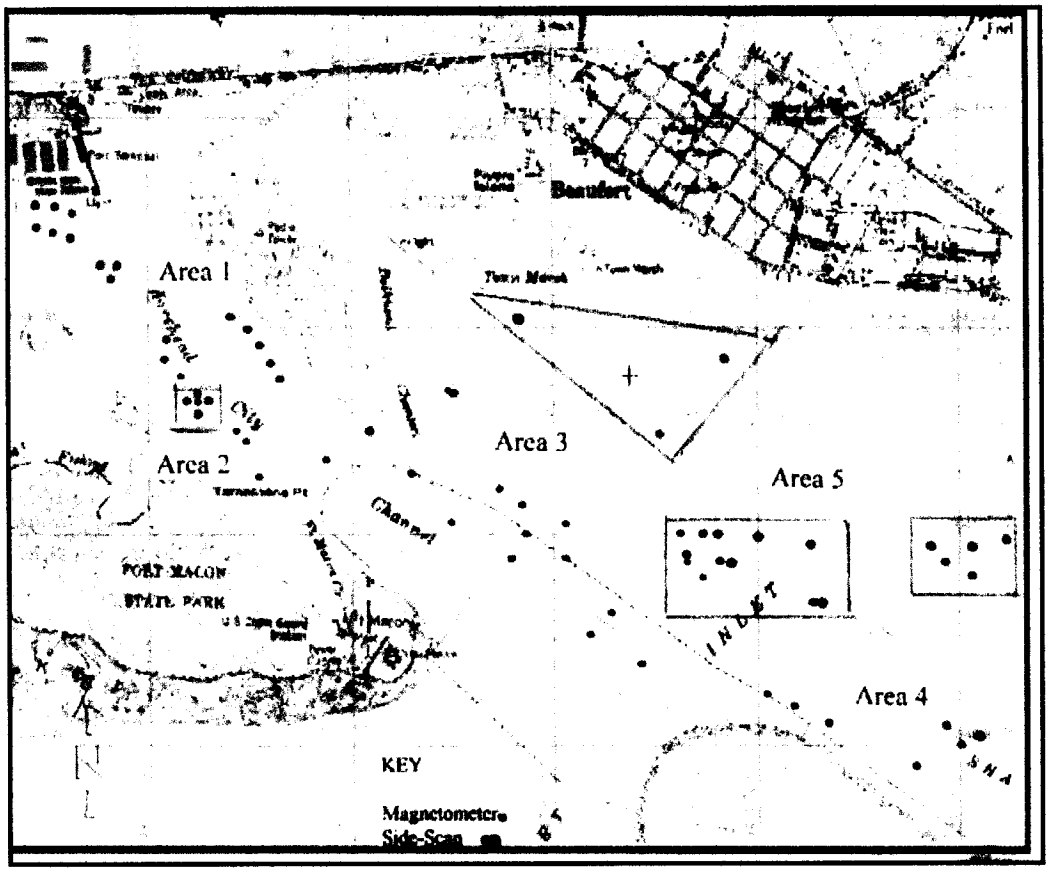

Figure 5.3 Target areas associated with wrecking process.

wreckage. The two areas are located northeast of the inlet's opening on a sediment plateau in less than four feet of water. The plateau drops off sharply on its western side. The dispersal of the anomaly signatures and sonar images follows the down current and upslope pattern anticipated from a buoyant hull fracture (Gearhardt 1988:33). The anomaly strength of Area 3 (Figure D.19) suggests ferrous metal either close to or just below the sediment surface. Associated side-scan images indicates the anomaly should be located in the first few feet of the sediment. Area 5 produced side-scan images of a linear structure with no associated magnetic anomalies. If the images represented eighteenth-century hull or framing structure, the magnetic signature would only be present with very close contact to the sensor. The image patterns suggest they follow the littoral drift within the inlet and radiate down current and upslope, similar to Area 3.

Area 2 produced magnetic anomalies as clusters typically expected from a buoyant structure site (Gearhardt 1988:33). The side-scan image (Figure E.37) could be related to a hatch cover. The magnetic anomaly may be associated with known cable. Area 4 produced one magnetic anomaly and two side-scan images (E.29 and E.30) not associated with underground cables, but that cannot be readily identified. The magnetic signature of 34 gammas for a short duration is generally associated with a cable; however, this area is off known cable zones.

The probable wrecking processes previously discussed for *Adventure* each produce unique characteristics when conducting a remote sensing survey. Distinctive signatures were found during the Beaufort Inlet survey in three search areas. Areas 3 and

5 both have anomalies that follow a down current and upslope pattern similar to the buoyant hull fracture predictive model. Area 2 displays characteristics similar to those associated with a buoyant hull, a linear pattern of multiple anomalies. This target is located in a sheltered area and close to shore. Although the data does not prove conclusively a wreck is present within the inlet, the areas discussed warrant further investigation.

Chapter Six

Conclusions and Recommendations

The primary goal of the Phase I Beaufort Inlet archaeological survey was to locate and identify anomalies possibly associated with the eighteenth-century pirate sloop *Adventure*, reported to have run aground and wrecked at Topsail Inlet during June 1718. Consideration was given to the nature of the inlet, modifications made over time and through human intervention, and historical documents pertaining to the wrecking. Historical records support both the presence and wrecking of *Adventure*. Remote sensing was utilized to record anomalies. The survey of Beaufort Inlet covered 87 percent of the permit area. Shallow depths and tidal flow hampered investigation of the inlet's entrance and along the eastern edge of Bird Shoal.

In the two hundred and eighty-four years since *Adventure*'s wrecking, Beaufort Inlet has changed because of the natural forces combined with human intervention. Affected by daily tidal fluctuations, accretion, and erosion caused by natural littoral drift, high winds, and severe weather conditions have all played a role in altering the inlet. Human modifications include dredging, dumping, and the annual removal of up to one million cubic yards of sediment and the installation of stone groins altering the inlet's natural evolution.

To successfully locate, record, and preserve underwater sites for future generations, a commitment and high level of investment in terms of time, effort, knowledge, and money is required. The study of a shipwreck provides an invaluable opportunity from several disciplinary perspectives to study the physical remains of a specific ship, for which little documentation survives. A shipwreck is an event that transforms a "dynamic and organized assemblage of static artifacts to a disorganized state with a long term of stability" (Muckleroy 1978:157-162). A ship and its contents provide

archaeologists and historians a glimpse into the economy, society, and culture that operated it. The ship itself provides insight into the ship's builders of the time, decisions on design, material availability and selection, method of construction, and technological ability. Inference could narrow identification through known ship construction methods employed on a wooden vessel with a single-mast step and overall keel length under 60 feet. A variety of cannon sizes and manufacturers combined with a variety of anti-personnel ordnance may provide supporting evidence of a pirate vessel.

Although the *Adventure* wrecking process is expected to have scattered the hull, discovery of even the smallest remains may provide a clue to the origin of the vessel, its size, and intended function. The survey produced several possible targets within the project area. These targets could be associated with a vessel that broke up and scattered and will require further investigation to determine their identity. Currents within the inlet averaging 2.5 knots make diving extremely difficult, but it may be possible to identify the twenty-minute slack tide window to conduct diver investigation of these targets.

The magnetic and side-scan anomaly clusters identified in the previous chapter should be investigated further. Investigation is required to establish cultural affiliations and dating. Archaeological verification of anomaly sources should be accomplished in an expedient manner because the inlet allows only a small window of diving opportunity. Diver ground truthing of the side-scan targets located in relatively shallow areas may be possible. The deeper, clustered magnetic variants, may best be approached by using hydraulic probing to prevent damage to potentially significant remains. Since movement of the inlet and sediment accretion may have buried *Adventure* within the shore of Bogue and /or Shackelford Banks. It is recommended that a shoreline magnetometer survey of these areas be performed.

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Appendix A

By His Majesty's Lieutenant Governor, and Commander in Chief, of
The Colony and Dominion of Virginia,
A PROCLAMATION
PUBLISHING THE REWARDS GIVEN FOR APPREHENDING, OR KILLING PYRATES.

WHEREAS, by an Act of Assembly, made at a Session of Assembly, begun at the Capital in Williamsburgh, the eleventh Day of November, in the fifth Year of His Majesty's Reign, entitled, An Act to encourage the apprehending & destroying of Pirates: It is, amongst other Things enacted, that all & every Person, or Persons, who, from & after the fourteenth Day of November, which shall be in the Year of our Lord one thousand seven hundred & nineteen, shall take any Pyrate, or Pyrates, on the Sea or Land, or in case of Resistance, shall kill any such Pyrate, or Pyrates, between the Degrees of thirty four, and thirty nine, of Northern Latitude, & within one hundred Leagues of the Continent of Virginia, or within the Provinces of Virginia, or North carolina, upon the Conviction, or making due Proof of the killing of all, & every such Pyrate, and Pyrates, before the Governor & Council, shall be entitled to have, & receive out of the Publick Money, in the Hands of the Treasurer of this Colony, the several Rewards following; that is to say, for Edward Teach, commonly called Captain Teach, or Blackbeard, one hundred Pounds; for every other Commander of a Pyrate Ship, Sloop, or Vessel, forty Pounds; for every Lieutenant, Master, or Quarter-Master, Boatswain, or Carpenter, twenty Pounds; for every other inferior Officer, fifteen Pounds, & for every private Man taken on Board such Ship, Sloop, or Vessel, ten Pounds; and, that for every Pyrate, which shall be taken by any Ship, Sloop, or Vessel, belonging to this Colony, or North Carolina, within the Time aforesaid, in any Place whatsoever, the like Rewards shall be paid according to the Quality and Condition of such Pyrates. Wherefore, for the Encouragement of all such Persons as shall be willing to serve his Majesty, and their Country, in so just & honourable an Undertaking, as the suppressing a Sort of People, who may be trully called Enemies to mankind: I have thought fit, with the Advice & Consent, of his majesty's Council, to issue this proclamation, hereby declaring, the said Rewards shall be punctually & justly paid, in current Money of Virginia, according to the directions of the said Act. And I do order & appoint this Proclamation, to be published by the Sheriffs, at their respective County-Houses, & by all Ministers & Readers, in the several Churches & happels, throughout this Colony.

Given at our Council Chamber at Williamsburgh, this 24th. Day of November, 1718,

in the fifth Year of His Majesty's Reign.
GOD SAVE THE KING.
A. SPOTSWOOD
(Johnson 1998:53-54)

Appendix B

By the King
A PROCLAMATION for the Suppressing of PYRATES

Whereas we have received information, that several Persons, Subject of Great Britain, have, since the 24th Day of June, in the Year of our Lord, 1715, committed divers Pyracies and Robberies upon the High-seas, in the West-Indies, or adjoining to our Plantations, which hath and may Occasion great Damage to the Merchants of Great Britain, and others trading into those Parts; and tho' we have appointed such a Force as we judge sufficient for suppressing the said Pyrates, yet the more effectually to put an End to the same, we have thought fit, by and with the Advice of our Privy Council, to Issue this our Royal Proclamation; and we do hereby promise, and declare, that in Case any of the said Pyrates, shall on, or before, the 5th of September, in the Year of our Lord 1718, surrender him or themselves, to one of our Principal secretaries of State in Great Britain or Ireland, or to any Governor or Deputy Governor of any of our Plantations beyond the Seas; every such Pyrate and Pyrates so surrendering him, or themselves, as aforesaid, shall have our gracious Pardon, of, and for such, his or their Pyracy, or Pyracies, by him or them committed, before the fifth of January next ensuing. And we do hereby strickly charge and command all our Governors and Commanders of any Forts, Castles, or other Places in our Plantations, and all others our Officers Civil and Military, to seize and take such of the Pyrates, who shall refuse or neglect to surrender themselves accordingly. And we do hereby further declare, that in Case any Person or Persons, on, or after, the 6th Day of September, 1718, shall discover or seize, or cause or procure to be discovered or seized, any one or more of the said Pyrates, so refusing or neglecting to surrender themselves as aforesaid, so as they may be brought to Justice, and convicted of the said Offense, such Person or Persons, so making such discovery or Seizure or causing or procuring such Discovery or Seizure to be made, shall have and receive as a Reward for the same, viz. for every Commander of any Private Ship or Vessel, the Sum of £100 and for every Lieutenant, Master, Boatswain, Carpenter, and Gunner, the sum of £ 30 and for every private Man, the Sum of £ 20. And if any Person or Persons, belonging to, and being Part of the Crew, of any Pyrate Ship or Vessel, shall, on or after the said sixth Day of September, 1718, seize and deliver, or cause to be seizes and delivered, any Commander or Commanders, of such Pyrate Ship or Vessel, so as that he or they be brought to Justice, and convicted of the said Offence, such Person or Persons, as a Reward for the same, shall receive for every such Commander, the sum of £ 200 which said Sums, the Lord Treasurer, or the Commissioners of our Treasury for the time being, are hereby required, and desired to pay accordingly.

Given at our Court, at Hampton-Court, the fifth Day of September, 1717, in the fourth Year of our Reign.

George R.

God save the King.

(Johnson 1998:13-14; Lee 1974:243)

Appendix C

Letter of Tobias Knight to Edward Thache

November 17, 1718

My ffriend

If this finds you yet in harbour I would have you make the best of your way up as soon as possible your affairs will let you I have something more to say to you than at present I can write; the bearer will tell you the end of our Indian Warr and Ganet can tell you in part what I have to say to you so referr you in some measure to him.

I really think these three men are heartily sorry at their difference with you and will be very willing to ask your pardon if I may advise be ffriends again, its better than falling out among your selves

I expect the Governor this night or tomorrow who I believe would be likewise glad to see you before you goe, I have not time to add save my hearty respects to you am your real ffreind

And Servant

T. KNIGHT
(Saunders 1886:343).

Appendix D

Magnetometer Anomalies

Tuesday June 5, 2001

Target Location	**Northing**	**Easting**
Tue0919-1:5	**346032.1**	**3841532.3**

Target Tue0919-1:5 is a single negative monopolar anomaly with a magnetic intensity of 141 gammas with a duration of 1.15 meters. This high intensity, short duration anomaly is normally associated with underground pipes or cables (Briener 1999:45).

Target Location	**Northing**	**Easting**
Tue0921-1:5	**346214.5**	**3841371.9**

Target Tue0921-1:5 represents a single negative monopolar anomaly with a 54 gamma magnetic signature and a duration of 1.71 meters. The magnetic signature was much lower, showing either a cable or pipe buried in deeper sediment or a smaller ferrous object lying below the sediment (Briener 1999:45).

Target Location	**Northing**	**Easting**
Tue0924-1:5	**346505.3**	**3841141.4**

Target 0924-1:5 is a single negative monopolar anomaly with a magnetic signature of 12 gammas and a duration of .58 meters. The strength and duration of the magnetic signal is only important in this case as it applies to other targets on this survey lane.

Target Location	Northing	Easting
Tue0927-1:5	**346788.8**	**3840915.9**

Target 0927-1:5 is a single negative monopolar anomaly with a magnetic signature of 74 gammas and a duration of 1.15 meters. This high intensity, short duration signal is characteristic of a underground pipe or cable (Breiner 1999:45).

Four other anomalies are shown in Figure D.1. Because of the variety and close proximity of these anomalies, they may represent a cluster of objects of various size and ferrous content.

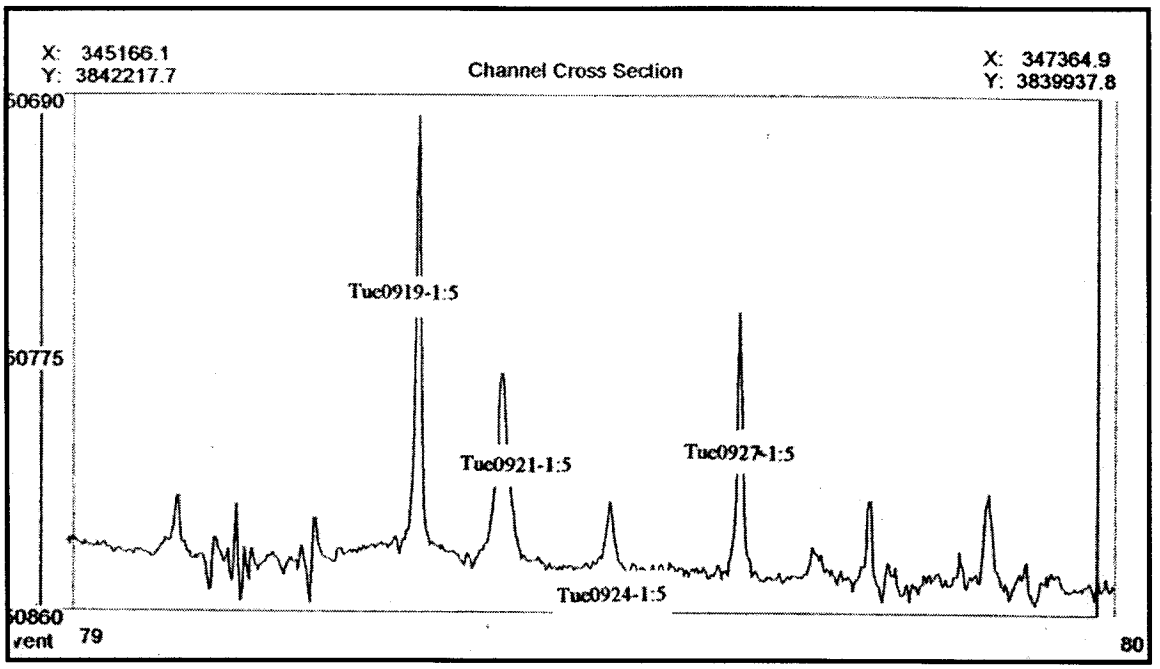

Figure D.1 Area 1, lane 5 magnetic signatures (Tue0919-1:5, Tue0921-1:5, Tue0924-1:5, Tue0927-1:5).

Target Location	Northing	Easting
Tue0951-1:1	**345329.9**	**3842195.5**

Target 0951-1:1 represents a cluster of dipolar anomalies with a maximum intensity of 85 gammas extending for a range of 17.18 meters. The moderately high intensity and short individual duration of the signature appears to be a group of underwater pipes or cables. The magnetic signature is shown below in Figure D.2.

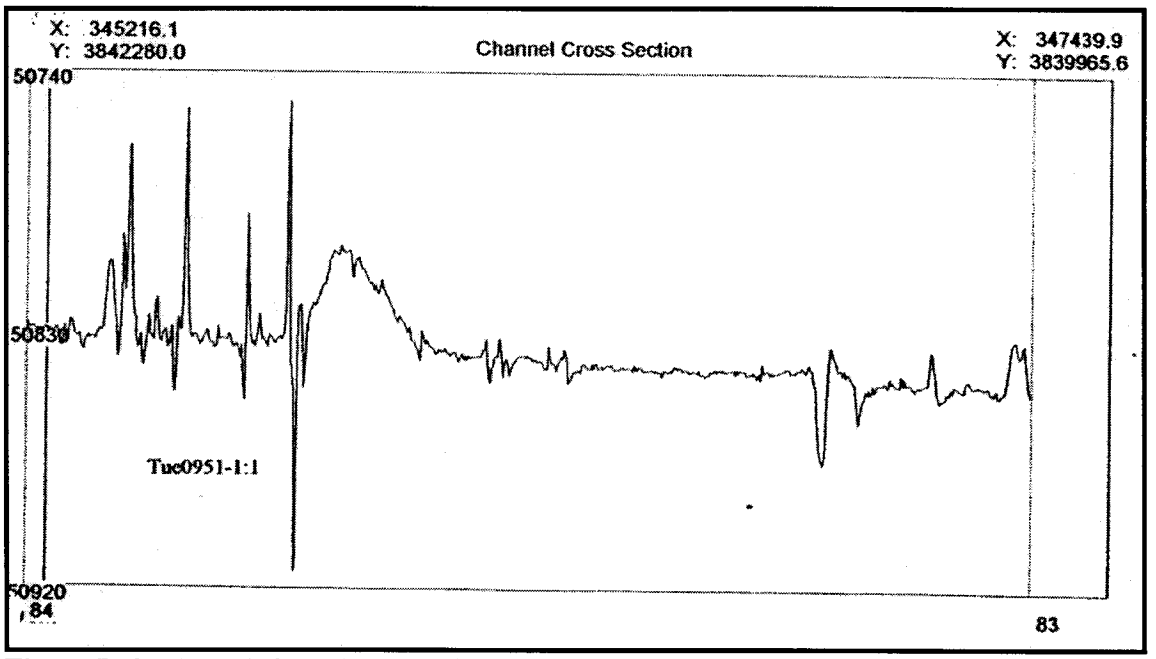

Figure D.2. Area 1, lane 1 magnetic signature (Tue0951-1:1).

Target Location	Northing	Easting
Tue1005-1:2	**345498.8**	**3842023.5**

Target 1005-1:2 is a cluster of multiple dipolar anomalies that reached a maximum magnetic signature of 181 gammas for a range of 7.1 meters. The strong intensity and short duration of the individual anomalies within this cluster are similar to those of underwater pipes or cables. This anomaly might represent chains that have been discarded over the years (Figure D.3).

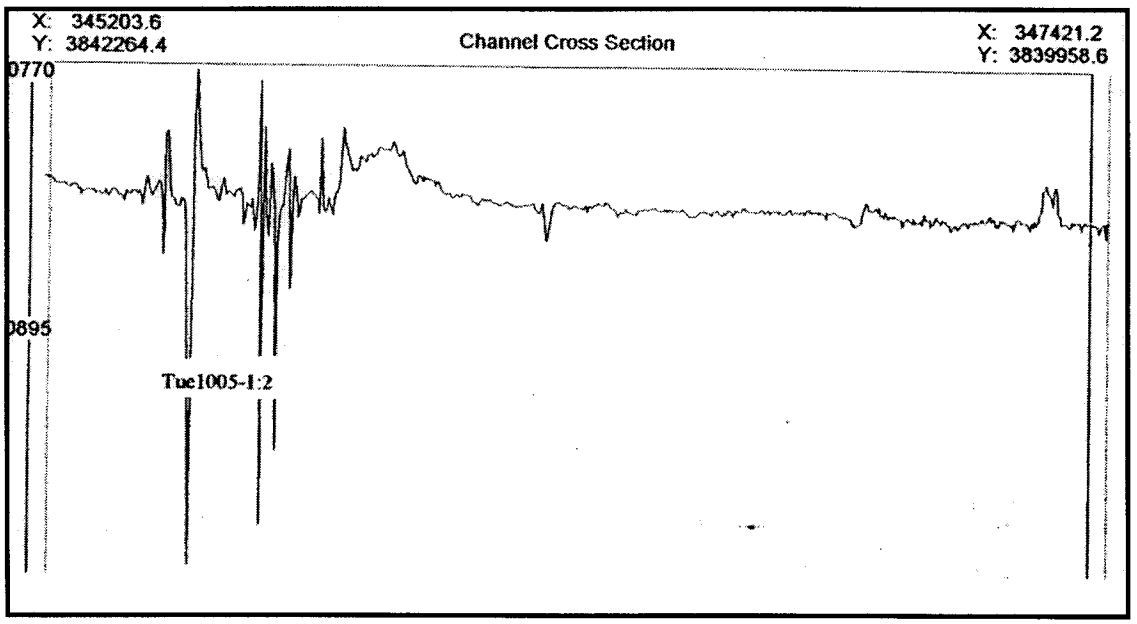

Figure D.3. Area 1, lane 2 magnetic signature (Tue1005-1:2).

Target Location	Northing	Easting
Tue1044-1:3	**345410.2**	**3842070.6**

Target Tue1044-1:3 represents a cluster of anomalies with a maximum gamma reading of 331 gammas and lasting for a duration of 10.3 meters. The target presents three strong magnetic signatures within the cluster (Figure D.4).

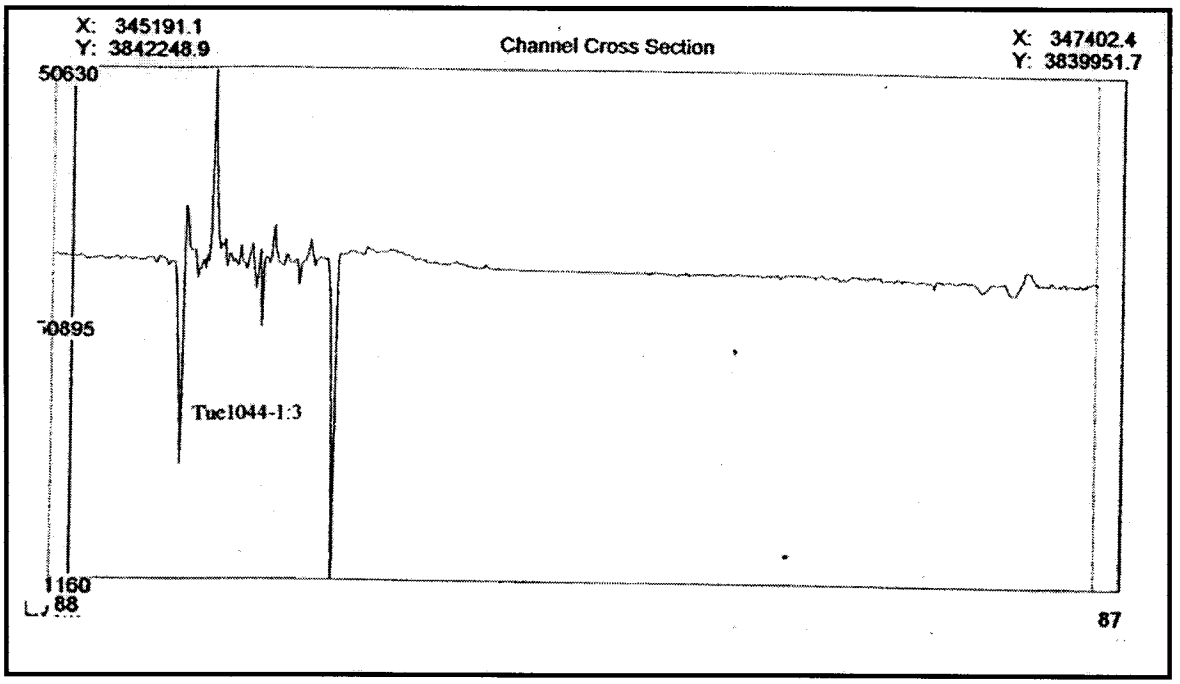

Figure D.4. Area 1, lane 3 magnetic signature (Tue1044-1:3).

Area 2

Target Location	**Northing**	**Easting**
Tue1515-2:5	**345086.1**	**3841979.3**

Target Tue1515-2:5 represents a cluster of magnetic signatures ending with a strong dipolar reading of 190 gammas with a duration of 1.72 meters. The signature is consistent with that of an underwater pipe or cable (Figure D.5).

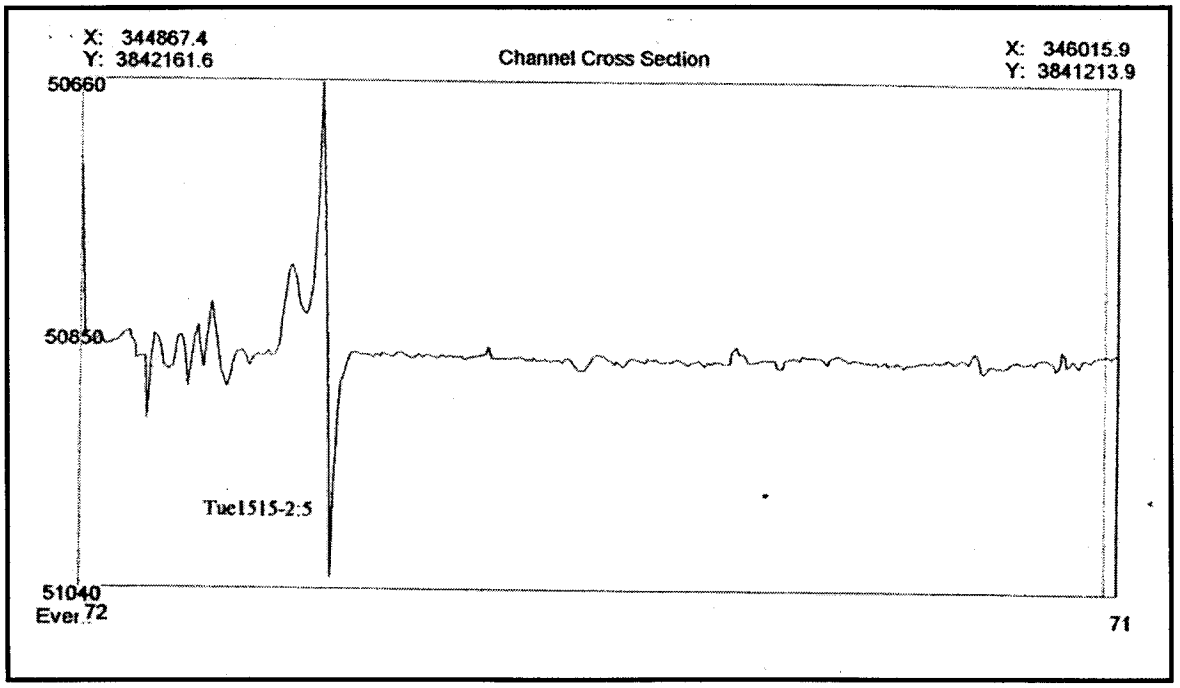

Figure D.5. Area 2, lane 5 magnetic signature (Tue1515-2:5).

Target Location	Northing	Easting
Tue1521-2:6	**345099.4**	**3641947.6**

Target 1521-2:6 represents a single negative monopolar anomaly producing 1,189 gammas and lasting for .57 meters. This high intensity and short duration signature may be associated with underwater cables or pipes (Figure D.6).

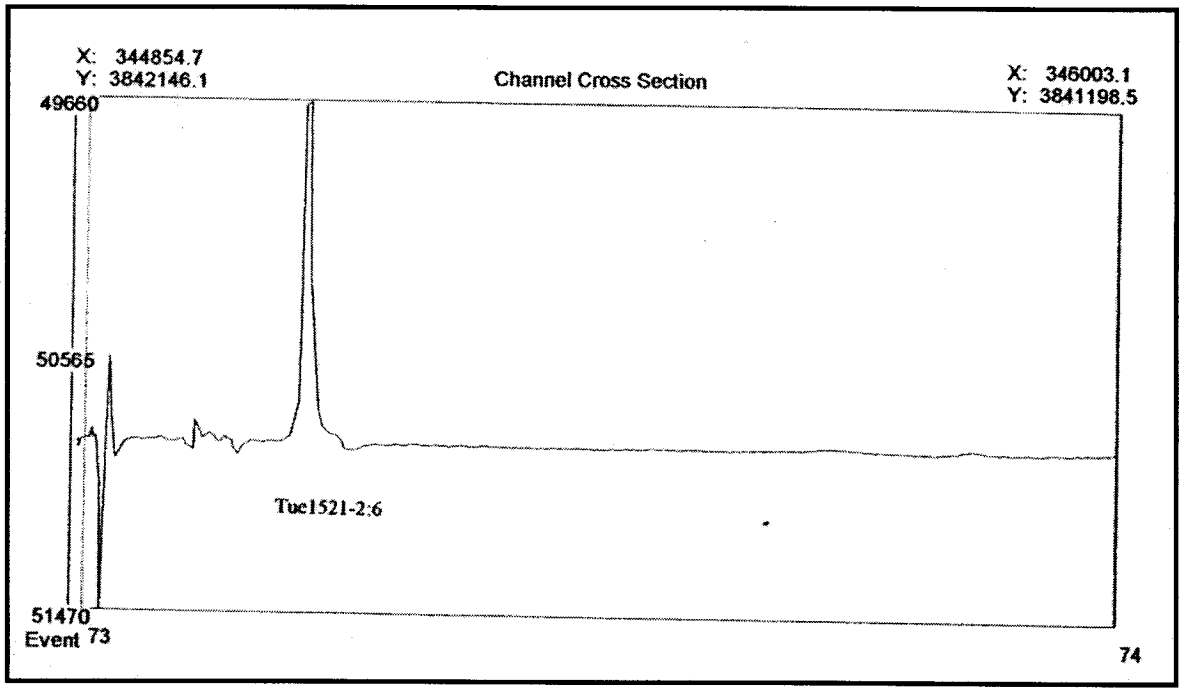

Figure D.6. Area 2, lane 6 magnetic signature (Tue 1521-2:6).

Target Location	Northing	Easting
Tue1559-2:8	**345788.3**	**3841325.9**

Target 1559-2:8 represents two anomalies . The first is a single negative monopolar anomaly measuring 180 gammas with a duration of 1.7 meters. The second anomaly is dipolar with a maximum of 657 gammas for a duration of 1.2 meters. The dipolar anomaly probably represents the signature of a cable or underwater pipe and is located in a known cable area (Figure D.7). The single monopolar represents the magnetic signature of fishing boat in the survey area.

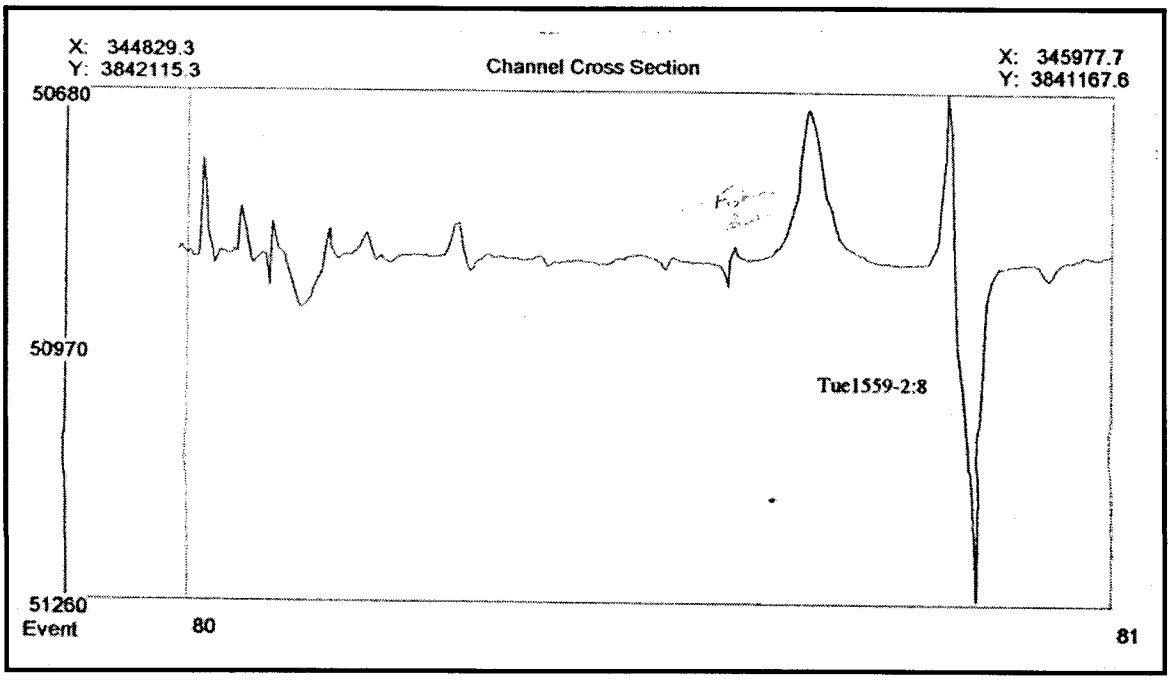

Figure D.7. Area 2, lane 8 magnetic signature (Tue1559-2:8).

Target Location	Northing	Easting
Tue1607-2:9	**345198.9**	**3841780.5**

Target Tue1607-2:9 represents a dipolar magnetic anomaly with a maximum signal of 137 gammas for .9 meters (Figure D.8).

Target Location	Northing	Easting
Tue 1608-2:9	**345090.5**	**3841873.8**

Target 1607-2:9 represents a single positive monopolar anomaly with a maximum signal of 170 gammas lasting for 1.2 meters (Figure D.8).

Target Location	Northing	Easting
Tue1609-2:9	**345006.2**	**3841949.2**

Target Tue1609-2:9 represents a dipolar magnetic anomaly of a maximum of 180 gammas for a duration of .6 meters. This signature of high amplitude and short duration is consistent with underwater pipes or cables (Figure D.8).

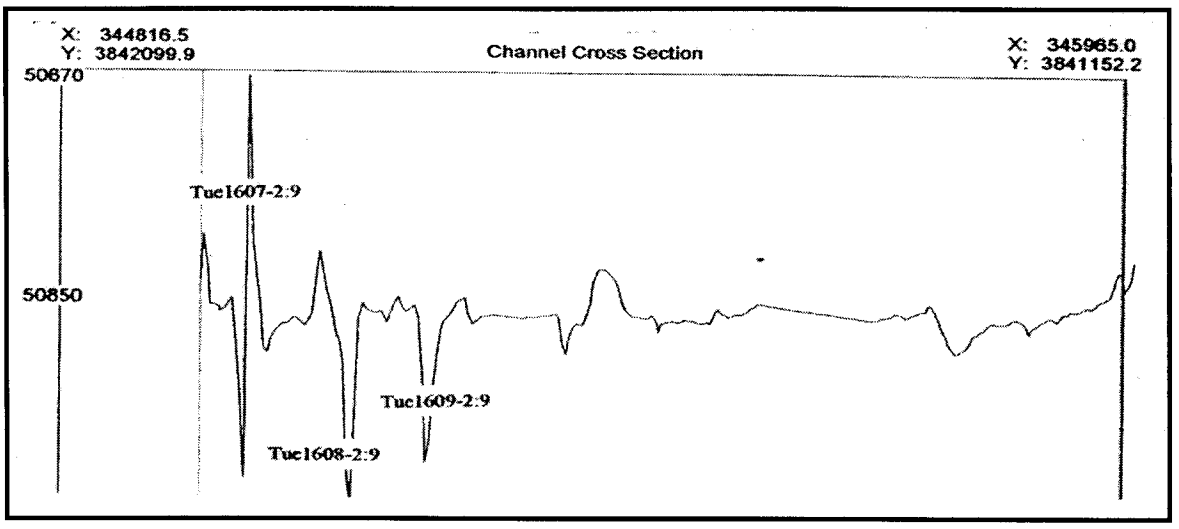

Figure D.8. Area 2, lane 9 magnetic signature (Tue1607-2:9, Tue1608-2:9, Tue1609-2:9).

Target Location	Northing	Easting
Tue1614-2:10	**345400.3**	**3841594.9**

Target Tue1614-2:10 represents a single negative monopolar anomaly of 799 gammas lasting for a duration of .9 meters. This anomaly presents a signature consistent with an underwater pipe or cable (Figure D.9).

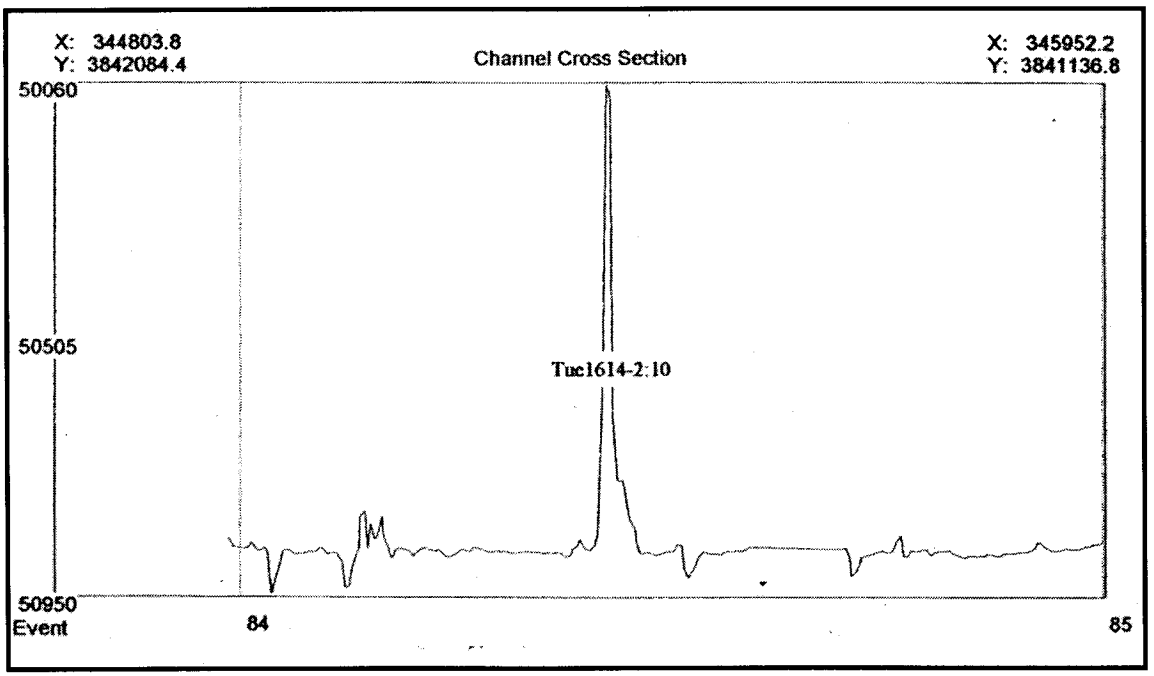

Figure D.9. Area 2, lane 10 magnetic signature (Tue1614-2:10).

Target Location	Northing	Easting
Tue1626-2:11	**34534.8**	**3841608.7**

Target Tue1626-2:11 represents a dipolar anomaly with a maximum gamma reading of 1,008 gammas lasting for .5 meters. This anomaly presents a signature of high intensity, short duration consistent with an underwater pipe or cable (Figure D.10).

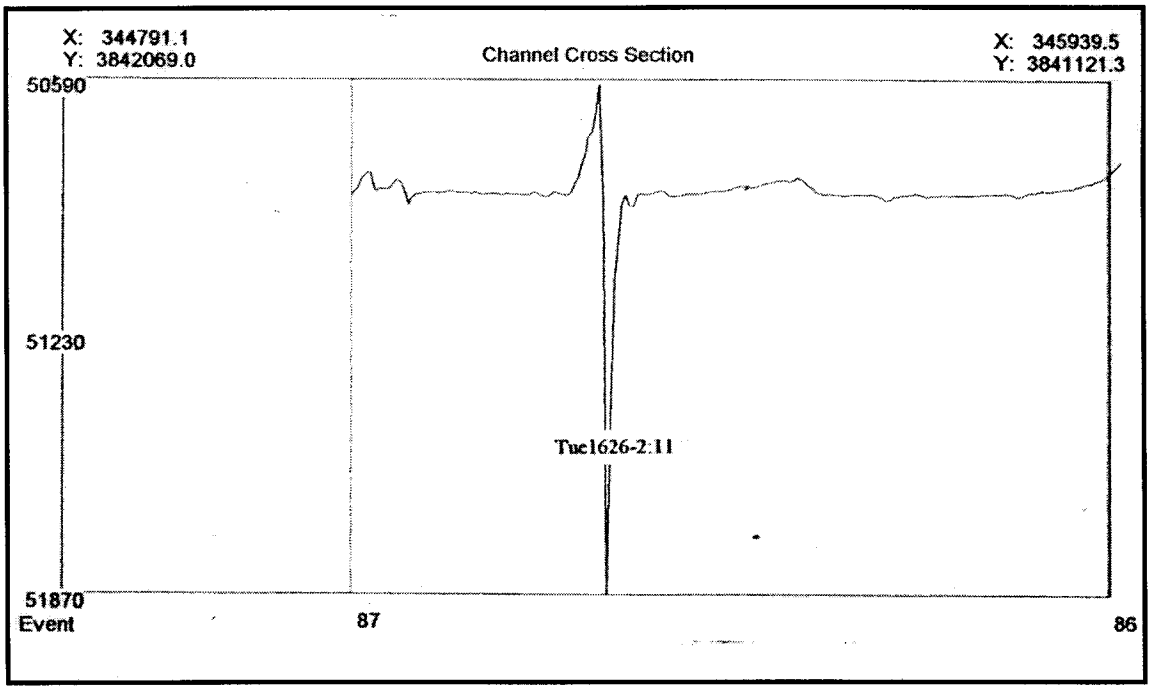

Figure D.10. Area 2, lane 11 magnetic signature (Tue1626-2:11).

Target Location	Northing	Easting
Tue1647-2:14	**345499.6**	**3841412.1**

Target Tue1647-2:14 represents a dipolar anomaly with a maximum reading of 434 gammas lasting for .5 meters. This anomaly presents a signature of high intensity, short duration consistent with an underwater pipe or cable (Figure D.11).

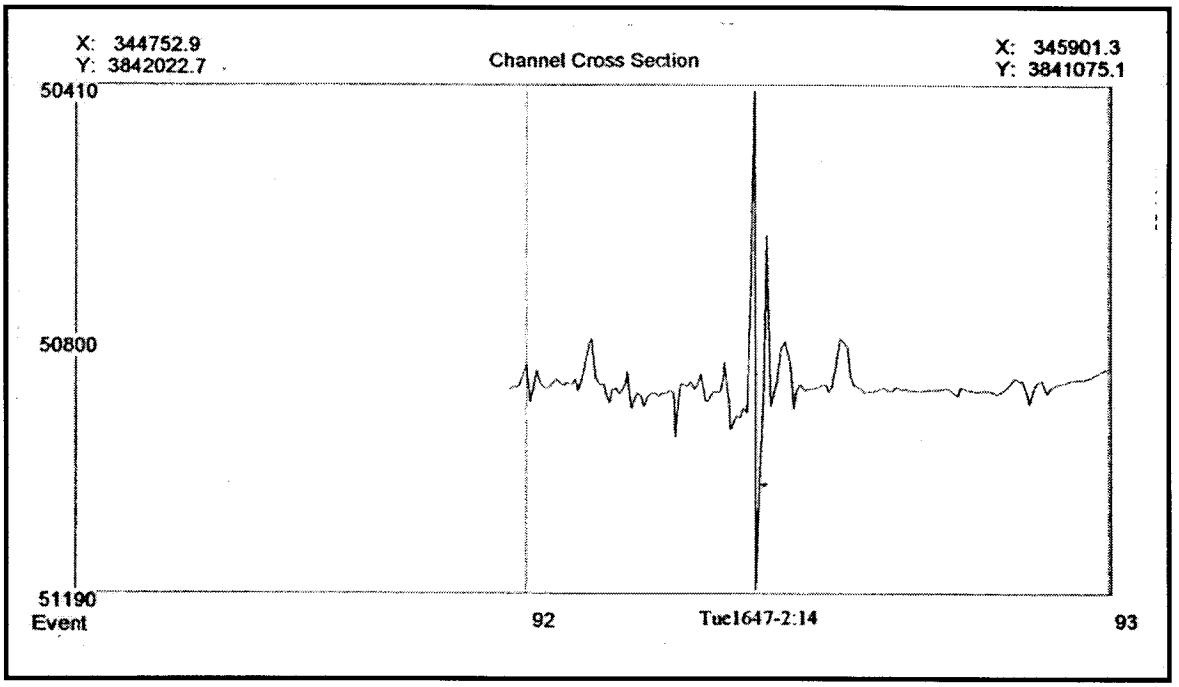

Figure D.11.Area 2, lane 14 magnetic signature (Tue1647-2:14).

Target Location	Northing	Easting
Tue1659-2:6	**345069.3**	**3841975.9**

Target Tue16459-2:6 represents a single negative monopolar anomaly with a maximum reading of 894 gammas and a duration of 1.2 meters. This anomaly presents a signature of high intensity, and relatively short duration consistent with an underwater pipe or cable (Figure D.12).

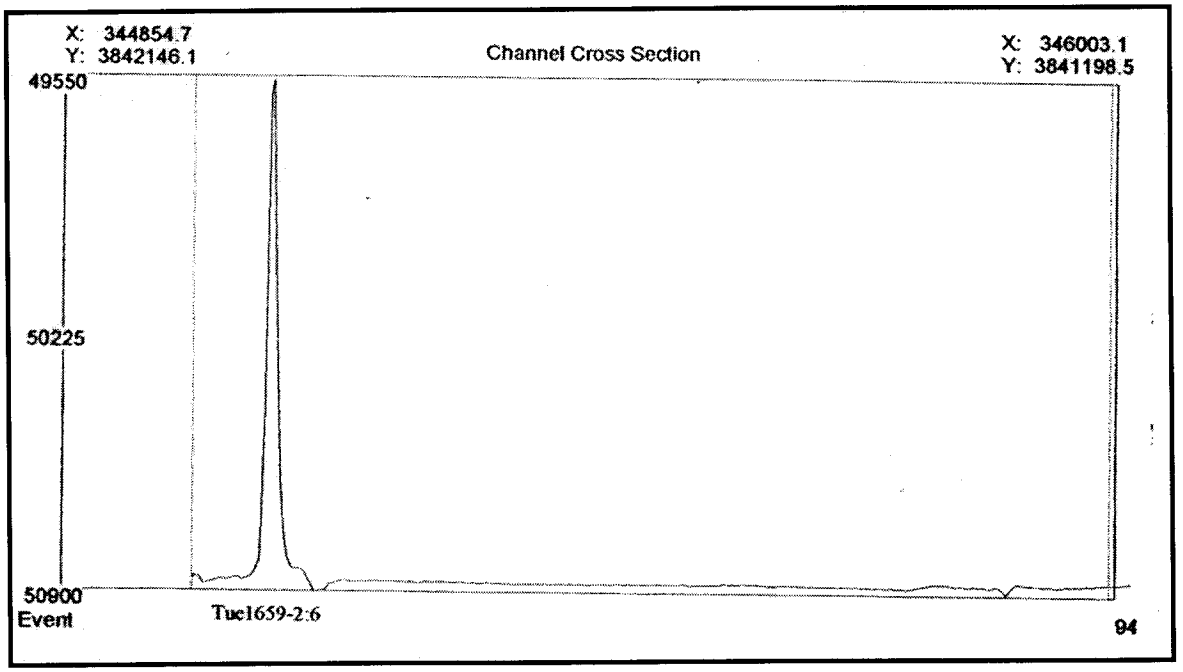

Figure D.12. Area 2, lane 6 magnetic signature (Tue1659-2:6).

Wednesday June 6, 2001

Area 3

Target Location	**Northing**	**Easting**
Wed1022-3:30	**347822.3**	**3840568.**7

Target Wed1022-3:30 represents a single positive monopolar anomaly with a maximum reading of 23 gammas and a duration of .75 meters (Figure D.13).

Target Location	**Northing**	**Easting**
Wed1024-3:30	**347614.2**	**3840785.9**

Target Wed1024-3:30 represents a dipolar anomaly with a maximum reading of 36 gammas and a duration of .5 meters (Figure D.13).

Target Location	**Northing**	**Easting**
Wed1026-3:30	**347453.0**	**3840953.8**

Target Wed1026-3:30 represents a single positive monopolar anomaly with a maximum reading of 11 gammas and a duration of .46 meters (Figure D.13).

Target Location	**Northing**	**Easting**
Wed1027-3:30	**347395.8**	**3841014.2**

Target Wed1027-3:30 represents a dipolar anomaly with a maximum reading of 41 gammas and a duration of .4 meters (Figure D.13).

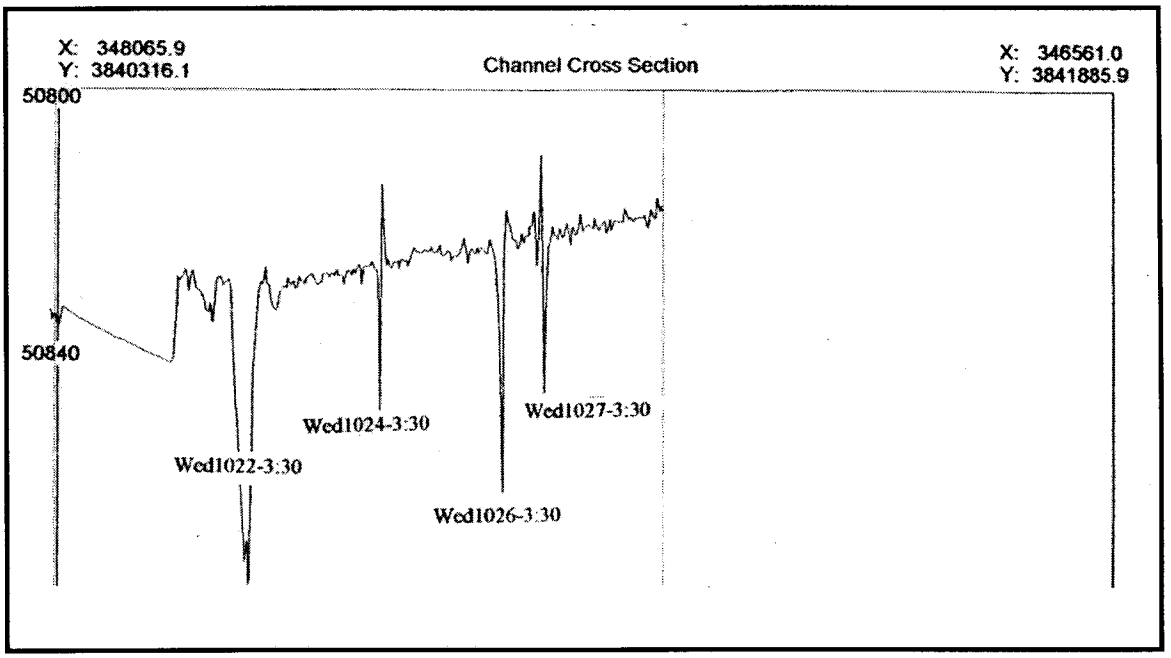

Figure D.13. Area 3, lane 30 magnetic signature (Wed1022-3:30, Wed1024-3:30, Wed1026-3:30, Wed1027-3:30).

Target Location	**Northing**	**Easting**
Wed1049-3:34	**347584.3**	**3840931.3**

Target Wed1049-3:34 represents a dipolar anomaly with a maximum reading of 65 gammas lasting for 1.7 meters. This anomaly has the signature of high intensity and relatively short duration consistent with that of an underwater pipe or cable (Figure D.14).

Target Location	**Northing**	**Easting**
Wed1050-3:34	**347471.4**	**3841049.2**

Target Wed1050-3:34 represents a single negative monopolar anomaly with a maximum reading of 30 gammas and a duration of .5 meters (Figure D.14).

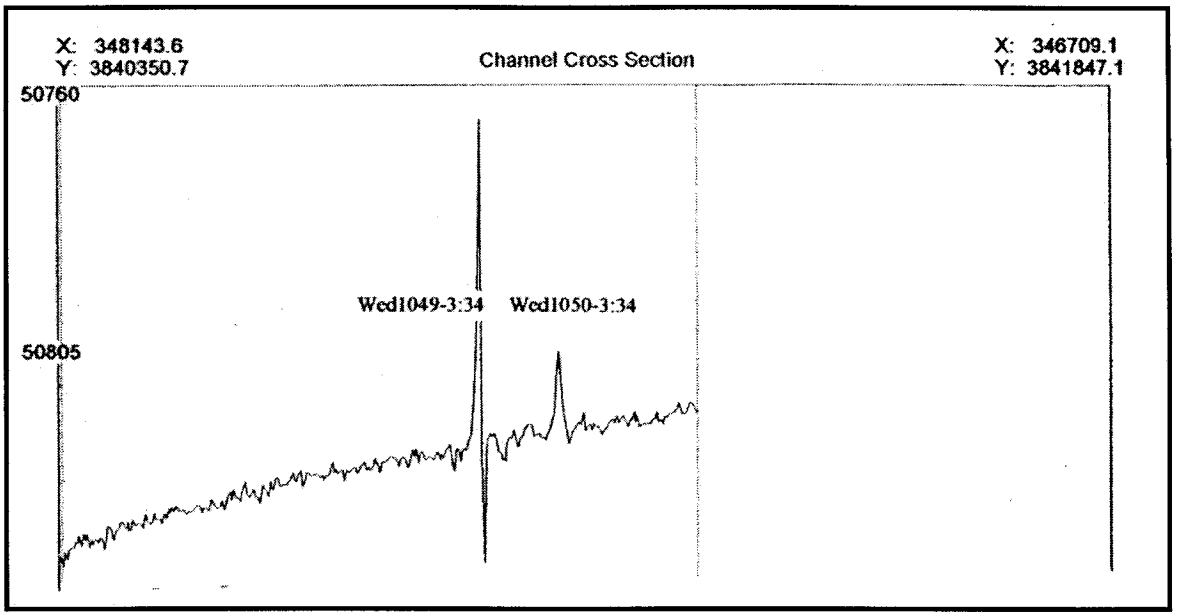

Figure D.14. Area 3, lane 34 magnetic signature (Wed1049-3:34, Wed 1050-3:34).

Target Location	**Northing**	**Easting**
Wed1050-3:10	**346722.4**	**3841142.5**

Target Wed1050-3:10 represents a single positive monopolar anomaly with a maximum reading of 17 gammas and a duration of .6 meters (Figure D.15).

Target Location	**Northing**	**Easting**
Wed1055-3:10	**347223.0**	**3840617.4**

Target Wed1055-3:10 represents a single positive monopolar anomaly with a maximum reading of 54 gammas and a duration of 1.15 meters (Figure D.15).

Target Location	Northing	Easting
Wed1057-3:10	347372.8	3840462.8

Target Wed1026-3:30 represents a cluster of magnetic signals centered upon a dipolar anomaly with a maximum reading of 24 gammas lasting for 2.2 meters (Figure D.15).

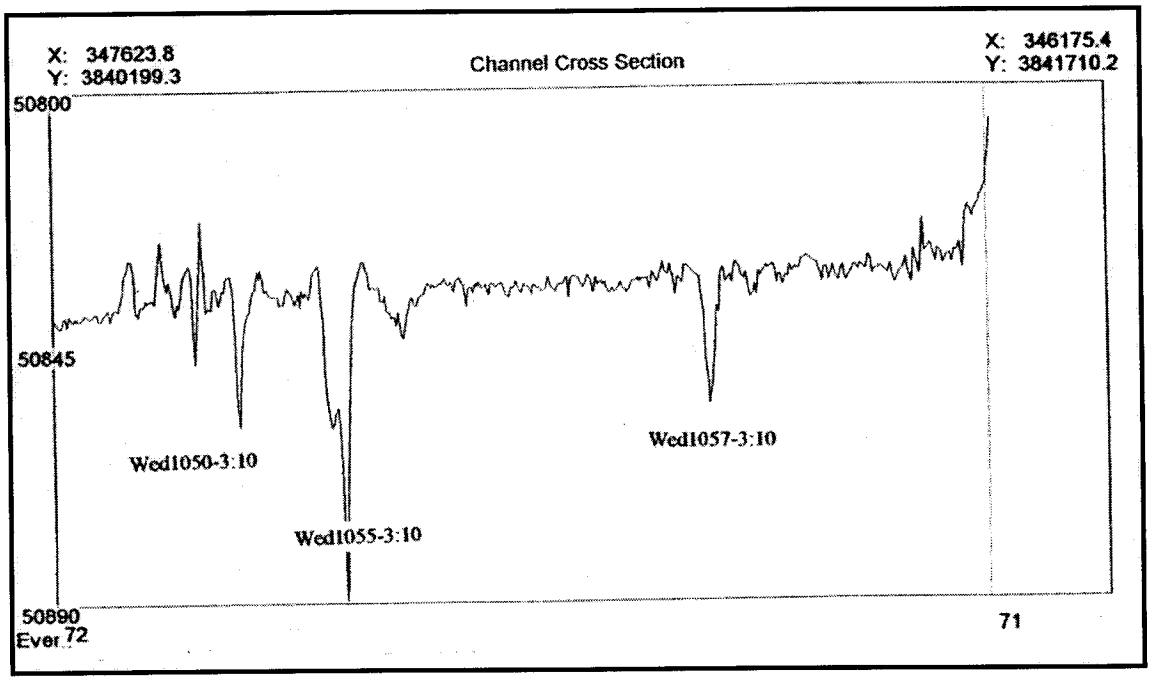

Figure D.15. Area 3, lane 10 magnetic signature (Wed1050-3:10, Wed1055-3:10, Wed1057-3:10).

Target Location	Northing	Easting
Wed1125-3:12	**347198.6**	**3840693.3**

Target Wed1125-3:12 represents a single positive monopolar anomaly with a maximum reading of 71 gammas and a duration of 1.71 meters (Figure D.16).

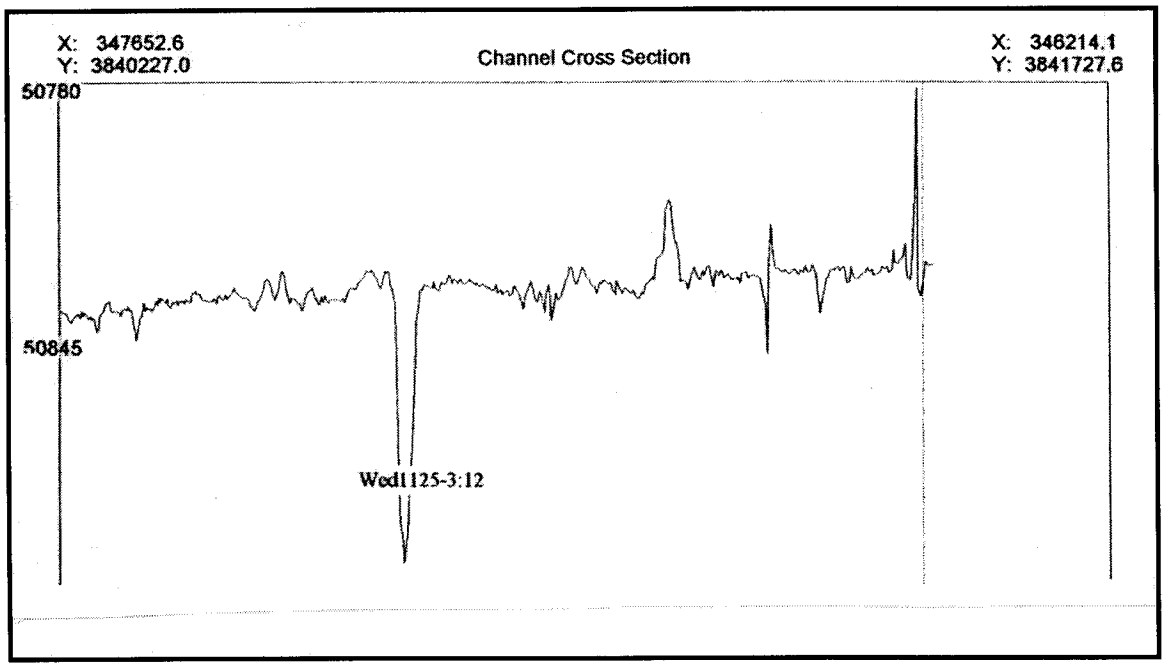

Figure D.16. Area 3, lane 12 magnetic signature (Wed1125-3:12).

Target Location	Northing	Easting
Wed1149-3:13	**346406.8**	**3841552.2**

Target Wed1149-3:13 represents a single negative monopolar anomaly with a maximum reading of 102 gammas and a duration of 1.15 meters (Figure D.17).

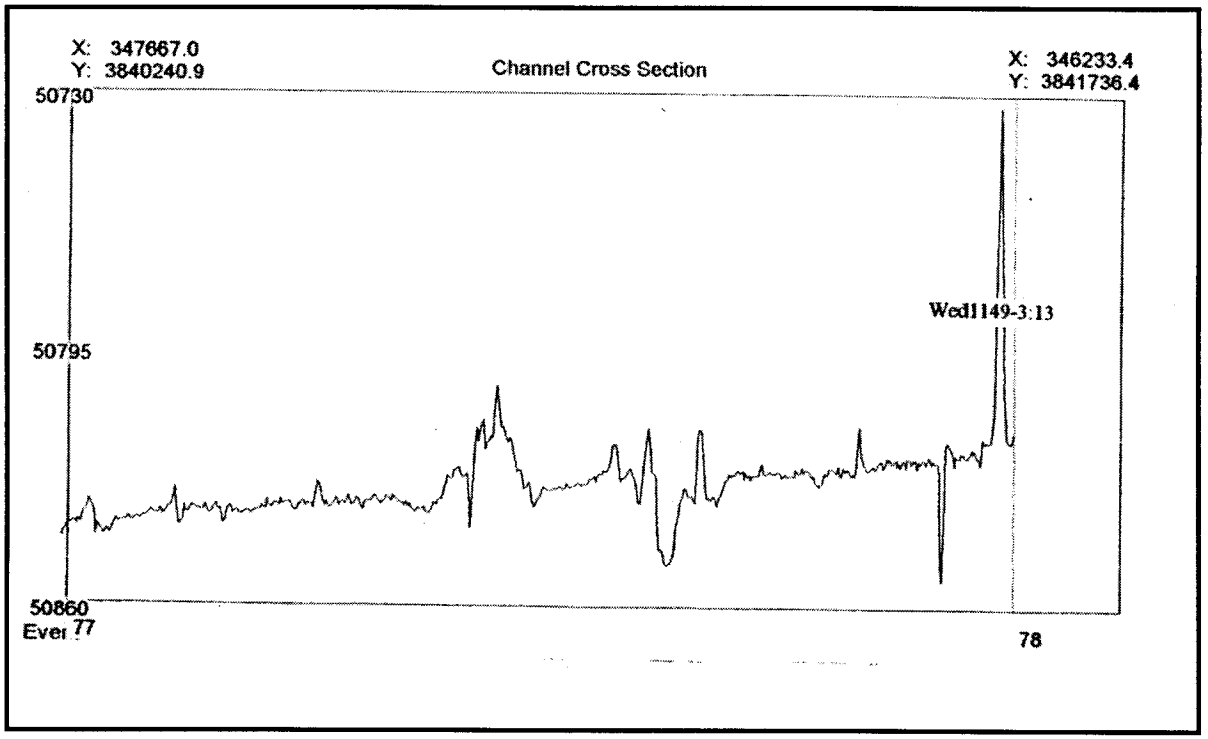

Figure D.17. Area 3, lane 13 magnetic signature (Wed1149-3:13).

Target Location	Northing	Easting
Wed1155-3:14	**346956.6**	**3841029.9**

Target Wed1155-3:14 represents a multiple cluster of dipolar anomalies with a maximum reading of 61 gammas and a duration of 4.58 meters (Figure D.18).

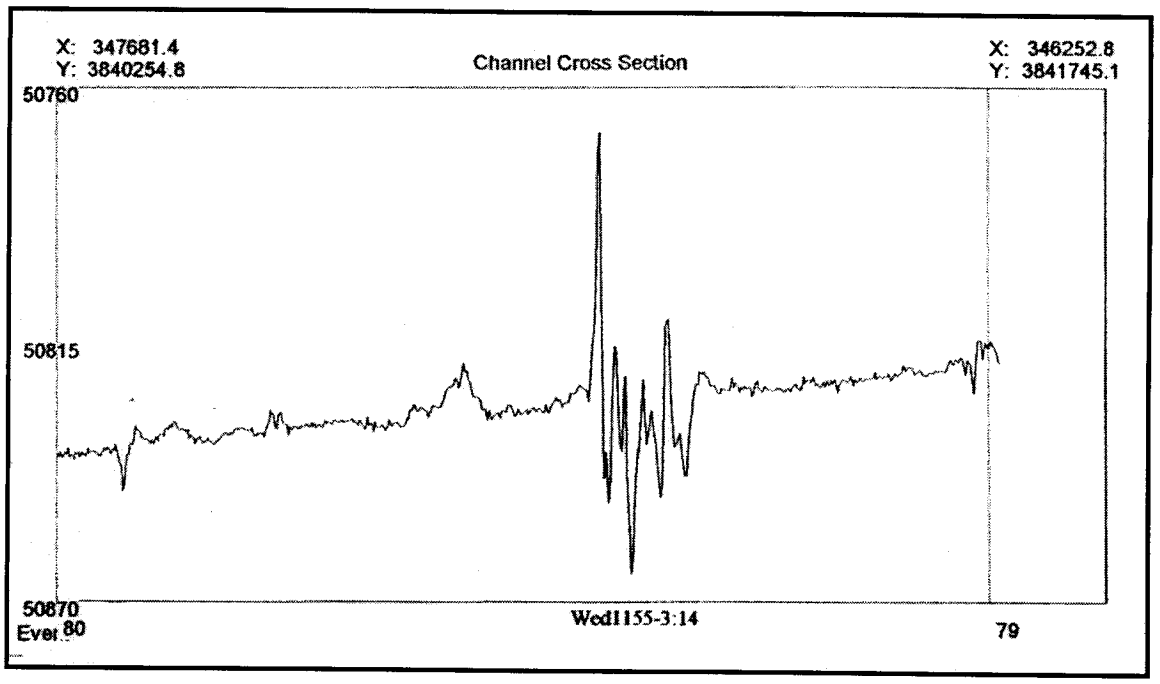

Figure D.18. Area 3, lane 12 magnetic signature (Wed1155-3:14).

Target Location	Northing	Easting
Wed1216-3:15	**346962.0**	**3841036.8**

Target Wed1216-3:15 represents a single negative monopolar anomaly with a maximum reading of 66 gammas lasting for 1.15 meters (Figure D.19).

Target Location	Northing	Easting
Wed1218-3:15	**346758.8**	**3841234.7**

Target Wed1218-3:15 represents a dipolar anomaly with a maximum reading of 42 gammas and a duration of 1.0 meters (Figure D.19).

Target Location	Northing	Easting
Wed1219-3:15	**346665.9**	**3841342.7**

Target Wed1219-3:15 represents a dipolar magnetic signature centered with a maximum reading of 24 gammas and a duration of 2.29 meters (Figure D.19).

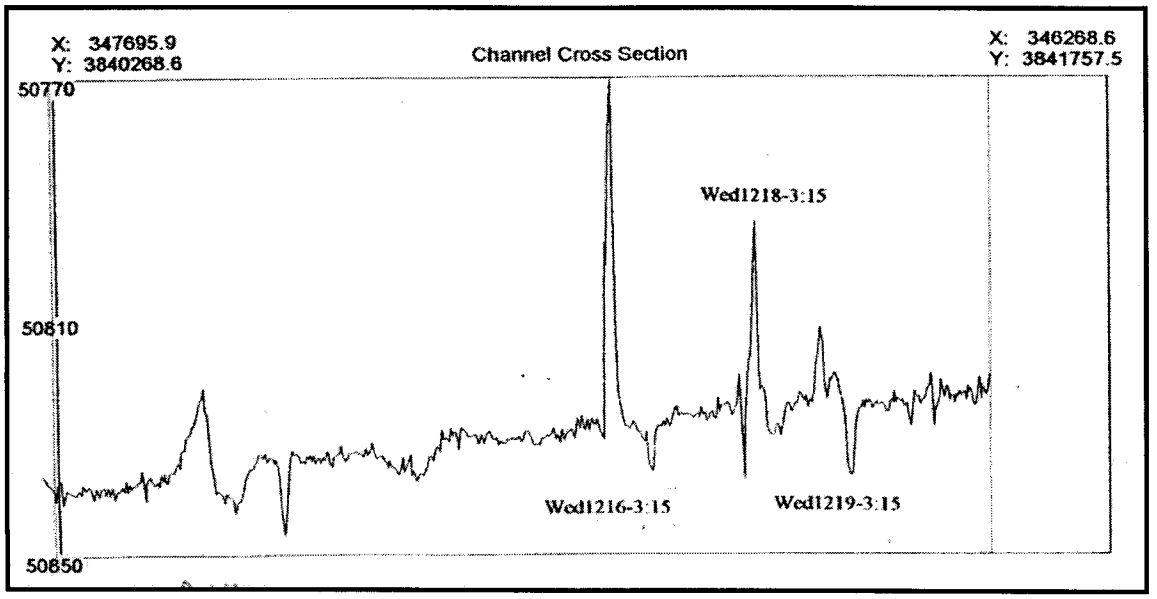

Figure D.19. Area 3, lane 15 magnetic signature (Wed1216-3:15, Wed1218-3:15, Wed1219-3:15).

Thursday June 7, 2001

Area 4

Target Location	**Northing**	**Easting**
Thu1540-4:10	**348228.8**	**3840335.1**

Target Thu1540-4:10 represents a single positive monopolar anomaly with a maximum reading of 65 gammas lasting for 1.15 meters (Figure D.20).

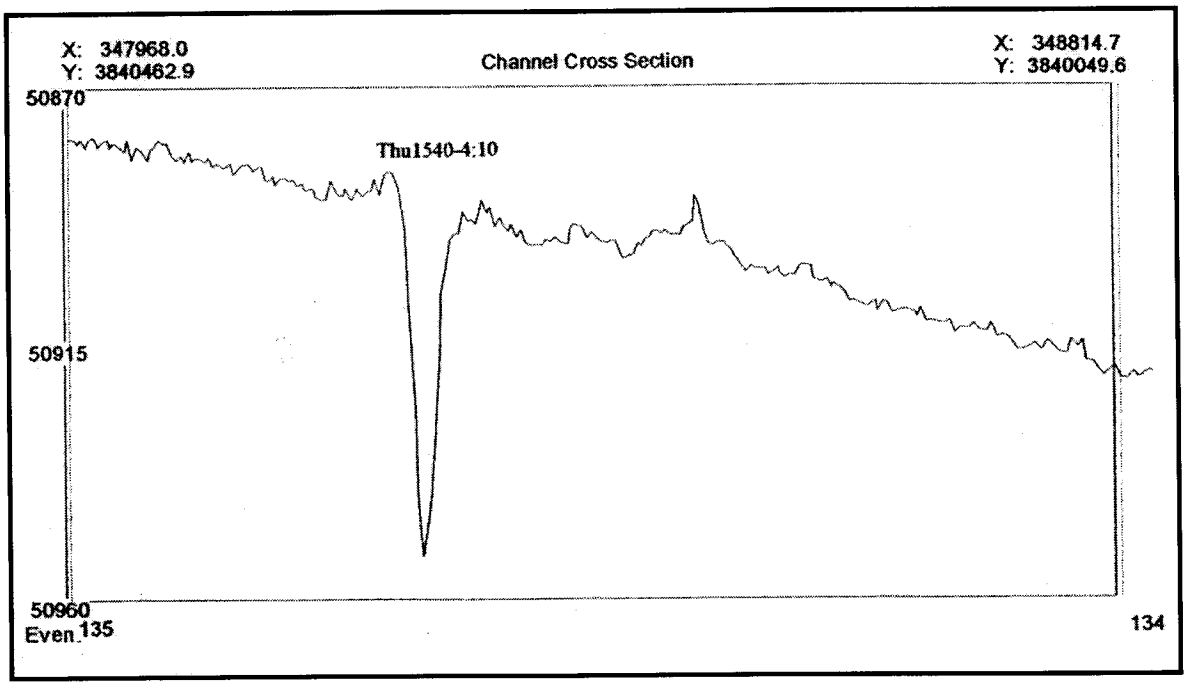

Figure D.20. Area 4, lane 10 magnetic signature (Thu1540-4:10).

Target Location	Northing	Easting
Thu1546-4:11	**348108.8**	**3840361.0**

Target Thu1546-4:11 represents multiple negative monopolar anomalies with a maximum reading of 3,990 gammas with the entire event lasting for 16.6 meters. It appears from this signature that the G-866 was running directly above an underwater power or telephone cable (Figure D.21).

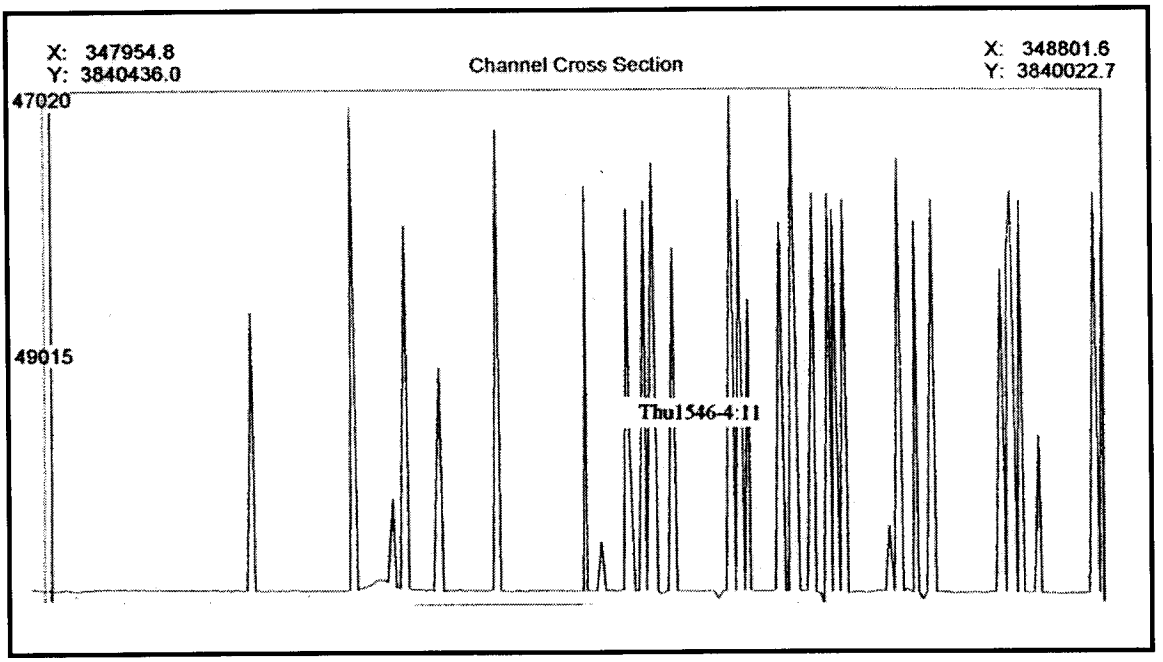

Figure D.21. Area 4, lane 11 magnetic signature (Thu1546-4:11).

Friday June 8, 2001

Area 4

Target Location	**Northing**	**Easting**
Fri1034-4:1	**348953.6**	**3840053.5**

Target Fri1034-4:1 represents a single dipolar anomaly with a maximum reading of 34 gammas and a duration of .5 meters. This anomoly appears to be an underwater pipe or cable (Figure D.22).

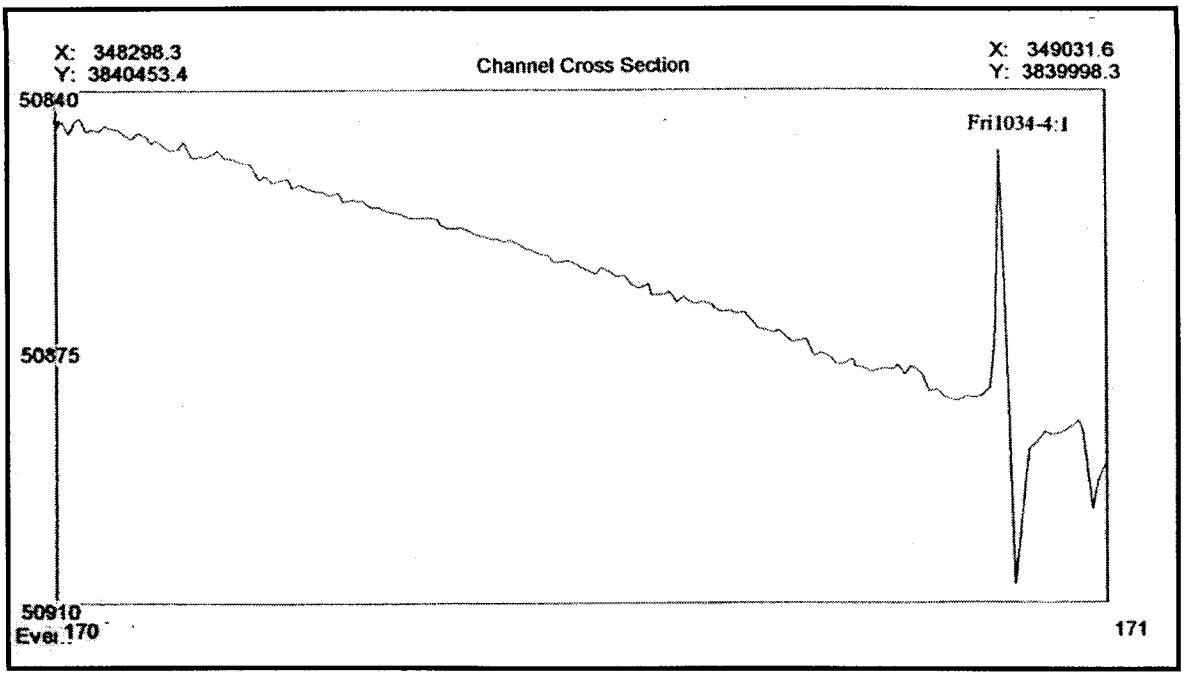

Figure D.22. Area 4, lane 1 magnetic signature (Fri1034-4:1).

Target Location	Northing	Easting
Fri 1148-4:9	**348183.6**	**3840315.4**

Target Fri1148-4:9 represents two magnetic signatures. The first, a single negative monopolar anomaly with a maximum reading of 80 gammas lasting for 1.75 meters. The second anomaly appears as a cluster of magnetic signals producing a maximum of 34 gammas for 6.87 meters (Figure D.23).

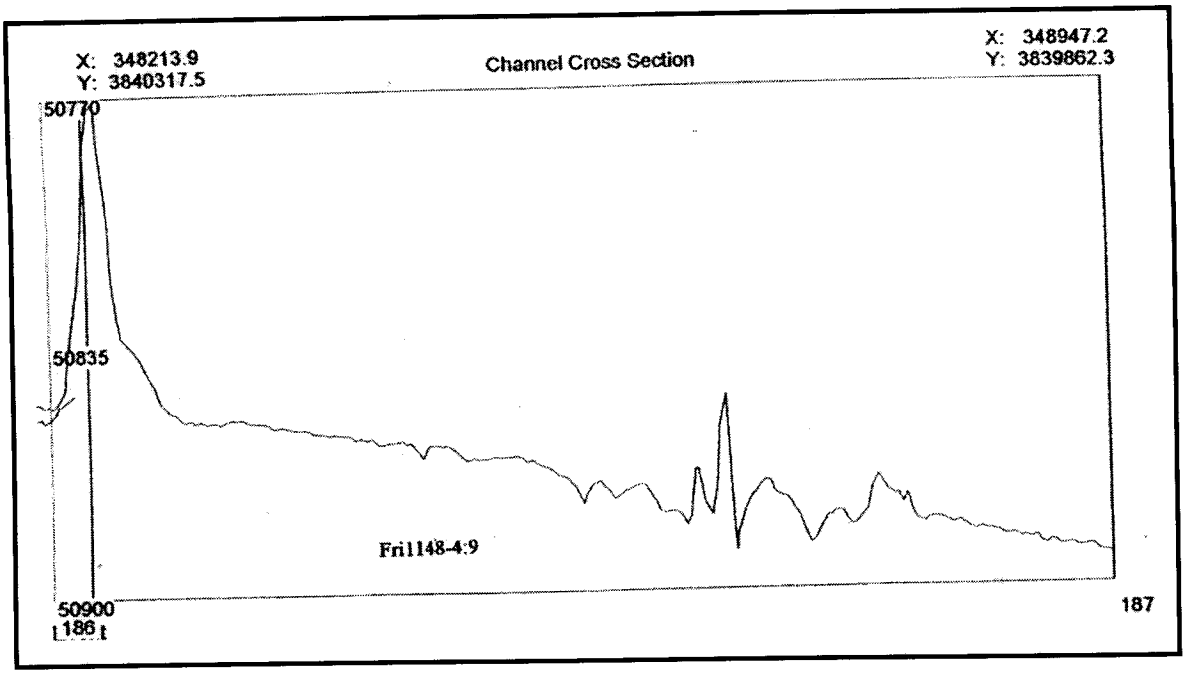

Figure D.23. Area 4, lane 9 magnetic signature (Fri1148-4:9).

Target Location	Northing	Easting
Fri1200-4:10	**348657.0**	**3840018.5**

Target Fri1200-4:10 represents a large magnetic signature. The anomaly appears to be dipolar with a maximum reading of 49 gammas lasting 2.86 meters (Figure D.24).

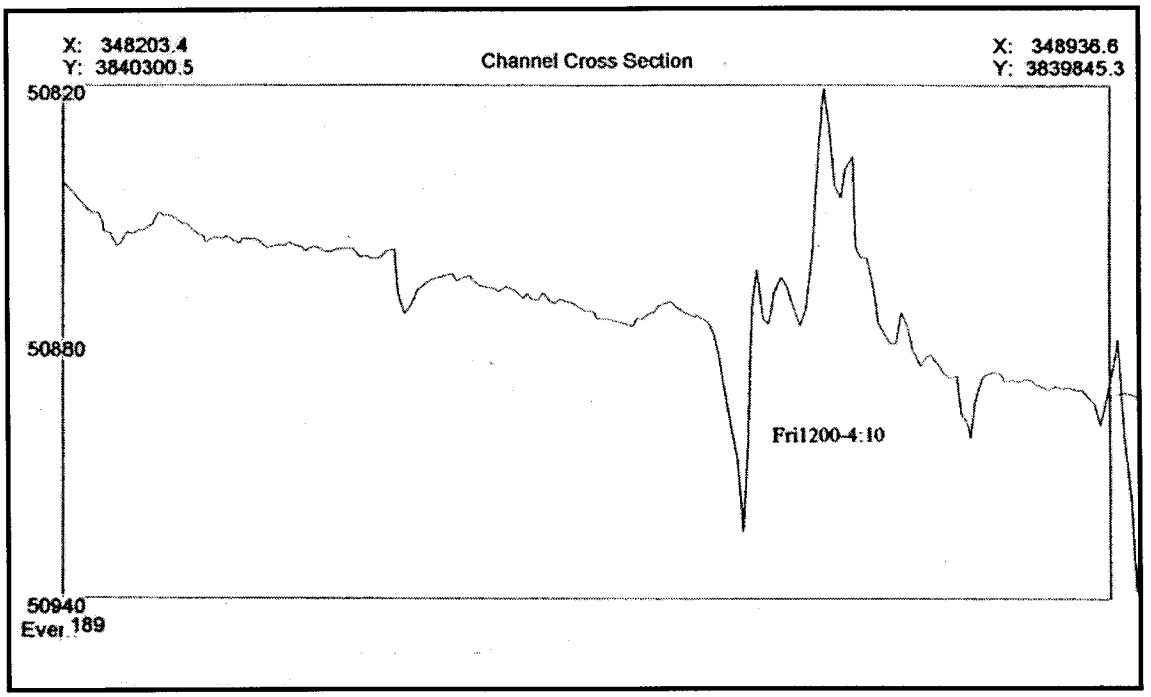

Figure D.24. Area 4, lane 10 magnetic signature (Fri1200-4:10).

Appendix E

Side-Scan Anomalies

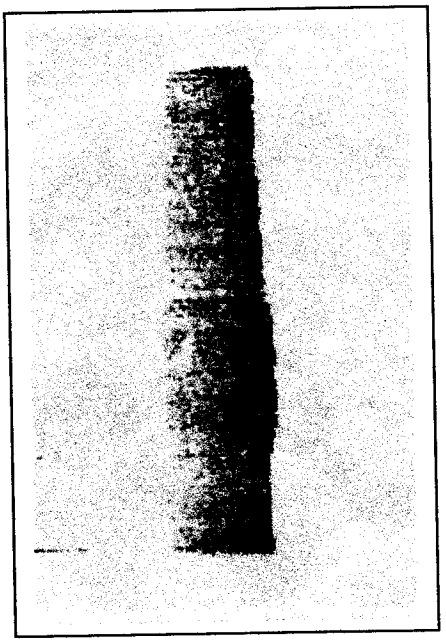

Figure E.1.

06Jun - Target 003

Target 003 is a cylindrical shaped object, probably representing a pipeline. The object is L 42.58m x W 7.23m. This target was located at 0950hrs at 34 42.556N 76 41.574W.

Figure E.2.

06 Jun - Target 009

Target 009 measures L13.25m x W 1.25m. This image was recorded at 1000 hrs at 34 42.466 N 76 41.490 W. This object has a well defined edge and tapers to a point. Width measurements were taken from the center of this object.

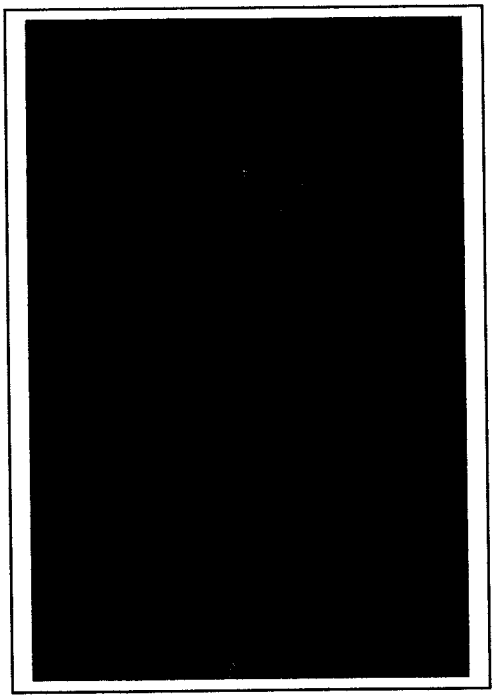

Figure E.3.

06 Jun - Target 015

Target 015 was recorded at 1004 hrs measuring L 3.87m x W 2.32m. The target was located at 3442.448 N 76 41.467 W., NE of Bogue Banks. The close proximity of Target 009 and Target 015 may be indicative of debris scatter from the same source. Its appearance is similar to that of an anchor.

Figure E.4.

06 Jun - Target 020

Target 020 was recorded at 1022 hrs at 34 41.957 N 76 40.305 W., SE of Radio Island. This unidentified object measures L 9.28m x W 3.91m. This object is associated with the magnetometer Target 1022 - 3:30.

Figure E.5.

06 Jun - Target 024

Target 020 was recorded at 1050 hrs at 34 42.158 N 7640.549 W., SE of Radio Island This object appears to be cylindrical measuring L 6.05m x W .64m. and may represent a dredge pipe. This target is associated with the magnetometer Target 1049-3:34.

Figure E.6.

06 Jun - Target 068

Target 068 was recorded at 1122 hrs at 34 41.999 N 76 40.344 W. This appears to be a log, or piling measuring L 3.44m x W .24 m.

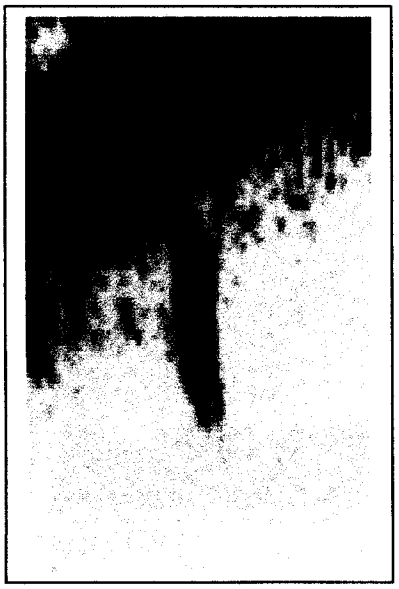

Figure E.7.

Jun - Target 071

06 Target 071 was recorded at 1124 hrs at 34 42.102 N 76 40.458 W., SE of Radio Island. Along with Target 068 appears to be linear measuring L 12.7m x W 1.57m. This linear target is associated with magnetometer Target 1125-3:12.

Figure E.8.

06 Jun – Target 111

Target 111 was recorded at 34 41.978 N 76 40.284 W., SE of Radio Island. It measures l 6.39m x W .12 m. The target has straight lines and does not appear to be part of the surrounding area. This contact is associated with magnetometer contact 1149-3:13.

Figure E.9.

06 Jun - Target 115

Target 115 was recorded at 1155 hrs at 34 42.119 N 76 40.444 W. This target represents debris, possibly an anchor and is isolated from other objects. The target is associated with magnetometer Target 1155-3:14.

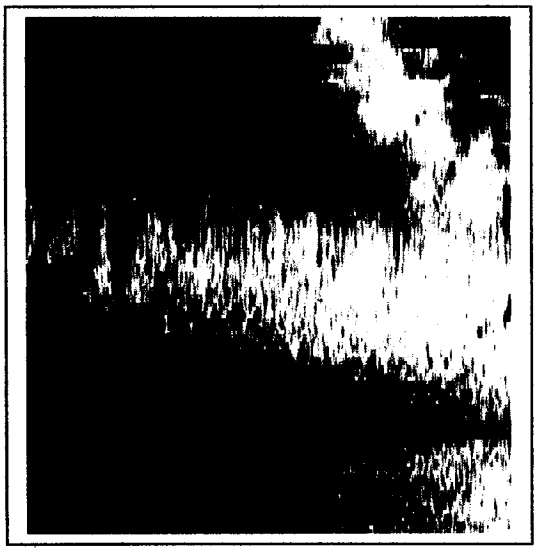

Figure E.10.

06 Jun - Target 166a

Target 166a was recorded at 1245 hrs at 34 42.495 N 7641.531W., W of Radio Island. This object measures L 12.7m x W 1.57m. It has a geometric shape, straight lines and cylindrical body. This return is in close proximity to Target 166.

Figure E.11

06 Jun - Target 166

Target 177 was recorded at 1245 hrs at 34 42.513 N 76 41.507 W. This cylindrical return measures L18.71 x W 15.63 m. this large return may be associated with Target166a.

Figure E.12.

06 Jun - Target 170

Target 170 was recorded at 1249 hrs at 34 42.403 N 76 41.451 W. This appears to be a log, broken in two places. It measures L 16.88 x W .68. It may be associated with Figure E.11. Target 166 due to its proximity.

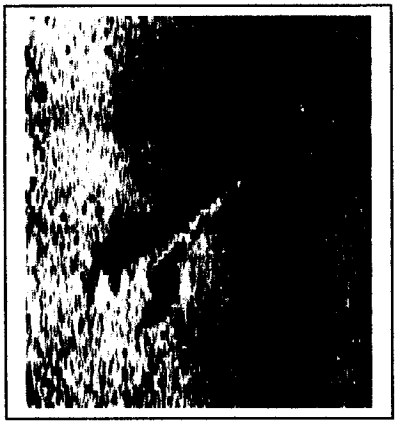

Figure E.13.

06 Jun - Target 172

Target 172 was recorded at 1252hrs at 34 42.465 N 76 41.531 W. It measures L 10.23 x W .82.

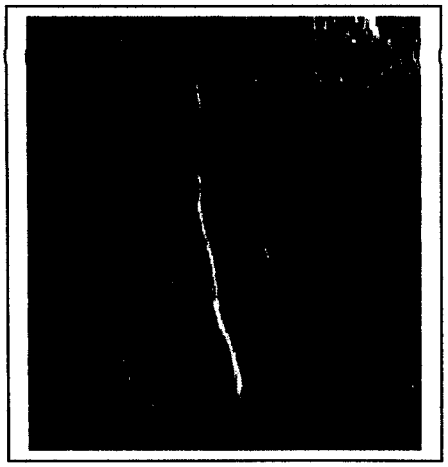

Figure E.14.

06 Jun - Target 175

Target 175 was recorded at 1254 hrs at 34 42.473 N 76 41.482 W. It measures L 28.67m x W .81m. The same size as 172 may indicate similar debris items.

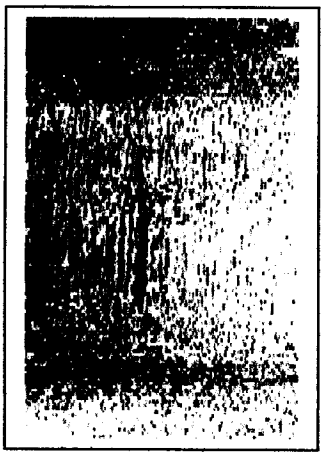

Figure E.15.

07 Jun – Target 119

Target 119 was recorded at 1208 hrs at 34 42.203 N 76 39.980 W. It measures L 8.30m x W .22m

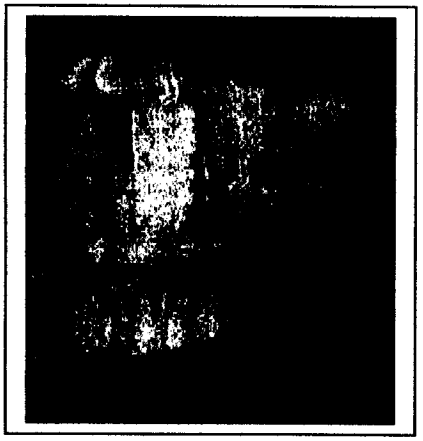

Figure E.16.

07 Jun – Target 138

Target 138 appears as a straight line and was recorded at 1306 hrs at 34 41.507 N 76 38.924 W. It measures L 4.20m x W .50m.

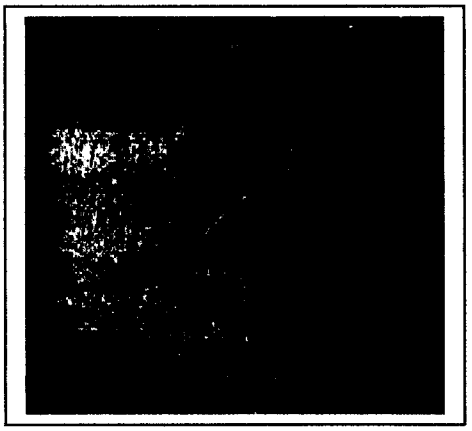

Figure E.17.

07 Jun – Target 142

Target 142 is a large isolated object that appears to taper at one end. This target was recorded at 1313 hrs at 34 41.782 N 76 39.608 W. It measures L 23.85m x W .53m.

Figure E.18.

07 Jun – Target 167

Target 167 was recorded at 34 41.706 N 76 39.586 W, S of Bird Shoal at 1536 hrs. The first contact measures L 4.78m x W .31m. The second contact measures L 4.77m x W .39 m.

Figure E.19.

07 Jun – Target 173

Target 173 was recorded at 1540 hrs at 34 41.622 N 76 39.327 W., located midway between Bird Shoal and Shackleford Bank. It measures L 5.23m x W .63m. This target is associated with the magnetometer Target 1540-4:10.

Figure E.20.

07 Jun- Target 181

Target 181 was recorded at 1546 hrs at 34 41.482 N 76 39.143 W, on the western end of Bird Shoal and is representative of a power cable. This target is shown as magnetometer Target 1546-4:1

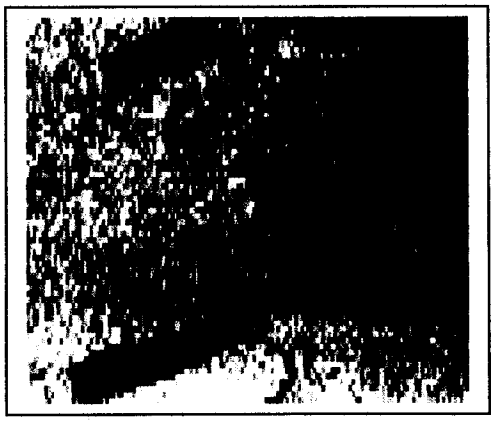

Figure E.21

07 Jun – Target 213

Target 213 was recorded at 1608 hrs at 34 41.548 N 76 39.143 W. The first contact measures L 2.30m x W .25m. The second contact measures L 3.63m x W .10m.

Figure E.22

07 Jun – Target 214

Target 214 was recorded at 1609 hrs at 34 41.570 N 76 39.201 W. It measures L 4.14m x W .39 m.

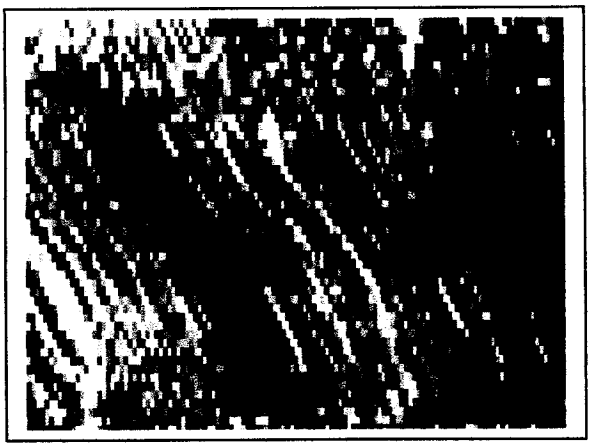

Figure E.23.

08 Jun - Target 000

Target 000 was recorded at 0832 hrs at 34 41.628 N 76 39.651 W. The object is L 3.14m x W.

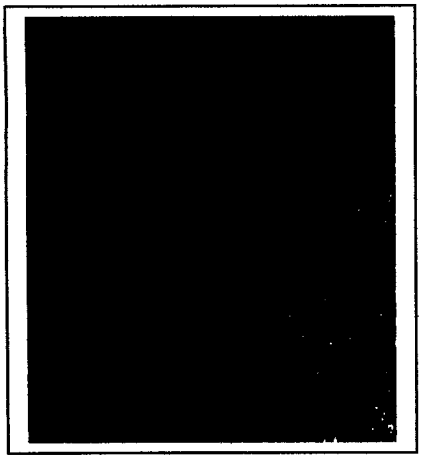

Figure E.24.

08 Jun - Target 119

Target 119 was recorded at 955 hrs at 34 41.826 N 76 39.565 W. This feature measures L 10.33 x W .96.

Figure E.25.

008 Jun - Target 138

Target 138 is round in appearance and may represent a 30"hole. The target was recorded at 1007 hrs at 34 42.285 N 76 39.544 W. It measures L .70 x W .70.

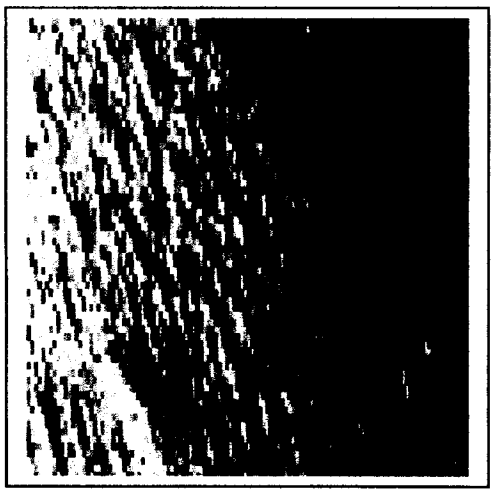

Figure E.26.

08 Jun - Target 166

Target 166 was recorded at 1025 hrs at 34 41.606 N 76 39.457 W. It measures l 3.36 x W .22. This target has straight edges and appears to taper at one end.

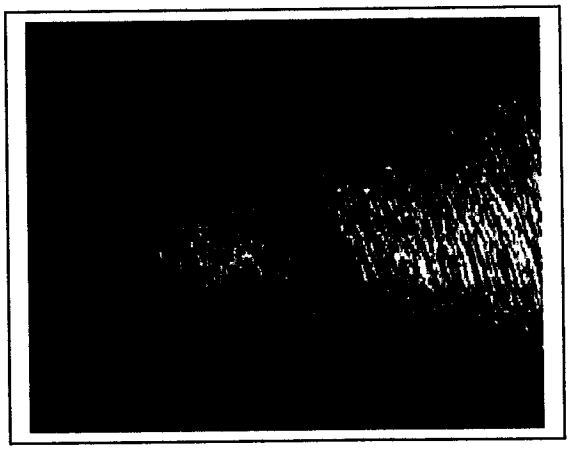

Figure E.27.

08 Jun - Target 170

Target 170 was recorded at 1027 hrs at 34 41.776 N 76 39.449 W. It measures L 6.76 x W .5m.

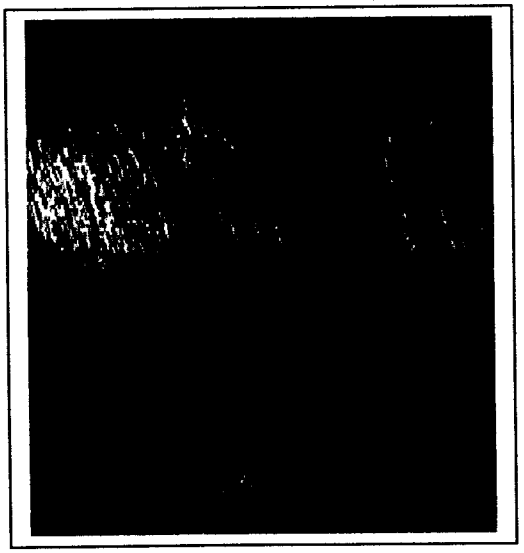

Figure E.28.

08 Jun - Target 181

Target 181 was recorded at 1034 hrs at 34 41.730 N 76 39.402 W. The first of these targets measures L 2.21 x W .12. The second target measures L 2.29 x W .12. These targets are shown as magnetometer Target 1034-4:1.

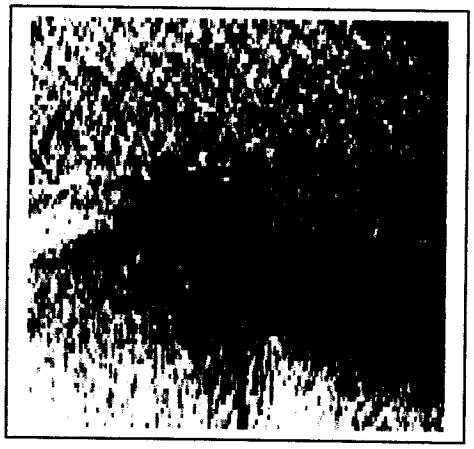

Figure E.29.

08 Jun - Target 292

Target 292 was recorded at 1149 hrs at 34 41.304 N 76 38.788 W. It measures L 2.44m x W 1.13m. this target is associated with magnetometer Target 1148-4:9.

Figure E.30.

08 Jun - Target 287

Target 287 shows two contacts recorded at 1145 hrs at 34 41.349 N 76 38.830 W. The first object measures L 3.19m x W .43m. The second object measures L 2.17m x W .16m. This was recorded at 1145 hrs.

Figure E.31.

08 Jun - Target 364

Target 364 was recorded at 1240 hrs at 34 41.417 N 76 39.330 W. The first contact measures L 4.30m x W .31m. The second contact measures L 4.85m x W .23m.

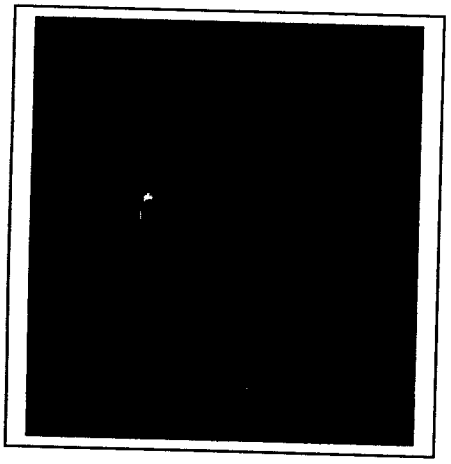

Figure E.32.

08 Jun - Target 372

Target 372 was recorded at 1300 hrs at 34 42.318 N 76 40.202 W. It measures l .94m x W .12m.

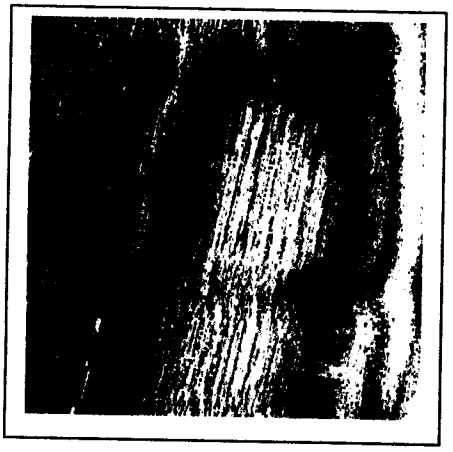

Figure E.33.

08 Jun - Target 380

Target 380 was recorded at 1308 hrs at 34 42.302 N 76 40.594 W. Its diameter is 5.95m.

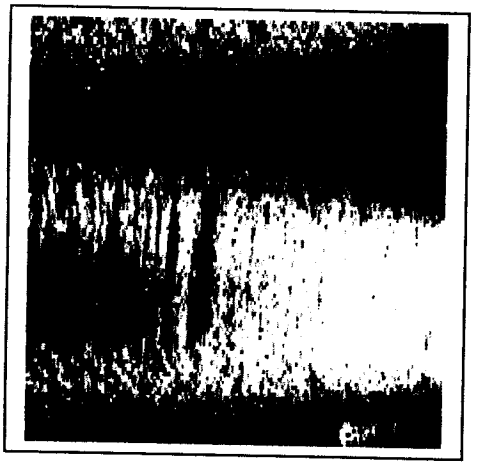

Figure E.34.

08 Jun - Target 385

Target 385 was recorded at 1315 hrs at 34 42.142 N 76 41.167 W. These two targets each measure L 3.06m x W .25m.

Figure E.35.

08 Jun- Target 386a

Target 386a was recorded at 1315 hrs at 34 42.184 N 76 41.218 W., N of Tombstone Point. This debris area appears to be log pilings dropped into the water. The first of the two contacts measures L 4.0m x W .23m. The second object measures L 4.70m x W 20m.

Figure E.36.

08 Jun - Target 386b

Target 386b was recorded at the same time and at the same previous target. It measures L 8.55m x W 1.17m.

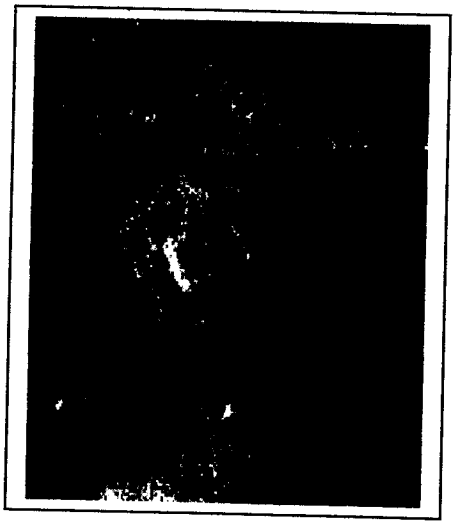

Figure E.37.

08 Jun - Target 386c

Target 386c is a rectangular shaped object, a hatch cover or part of a floating dock, recorded at the same time and in the same location as the previous two targets. It measures L 1.47m x W 1.14m.

Appendix F
Magnetic Contour and Surface Plots

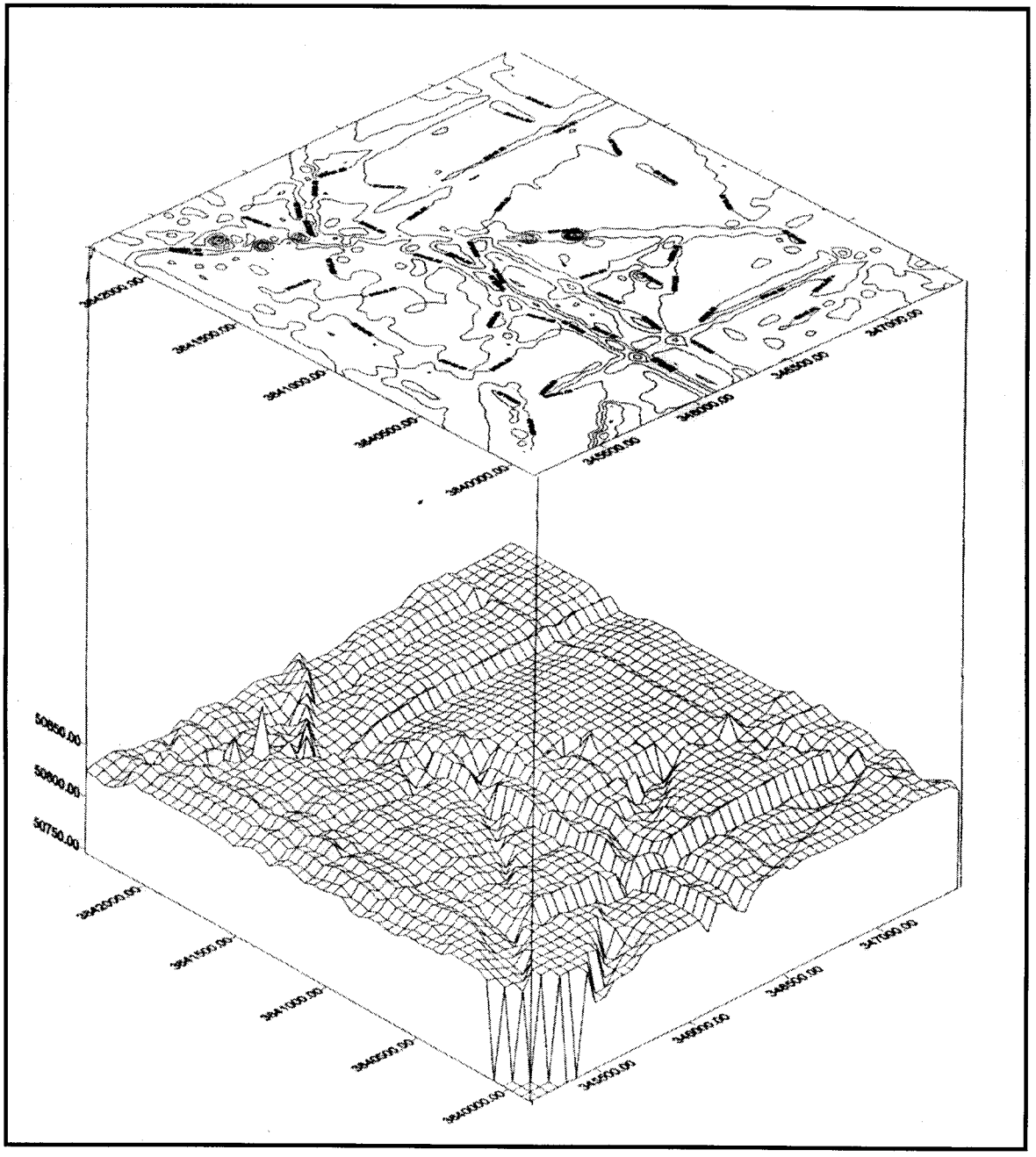

Figure F.1. Tuesday magnetic contour and surface plot, Area 1 and Area 2.

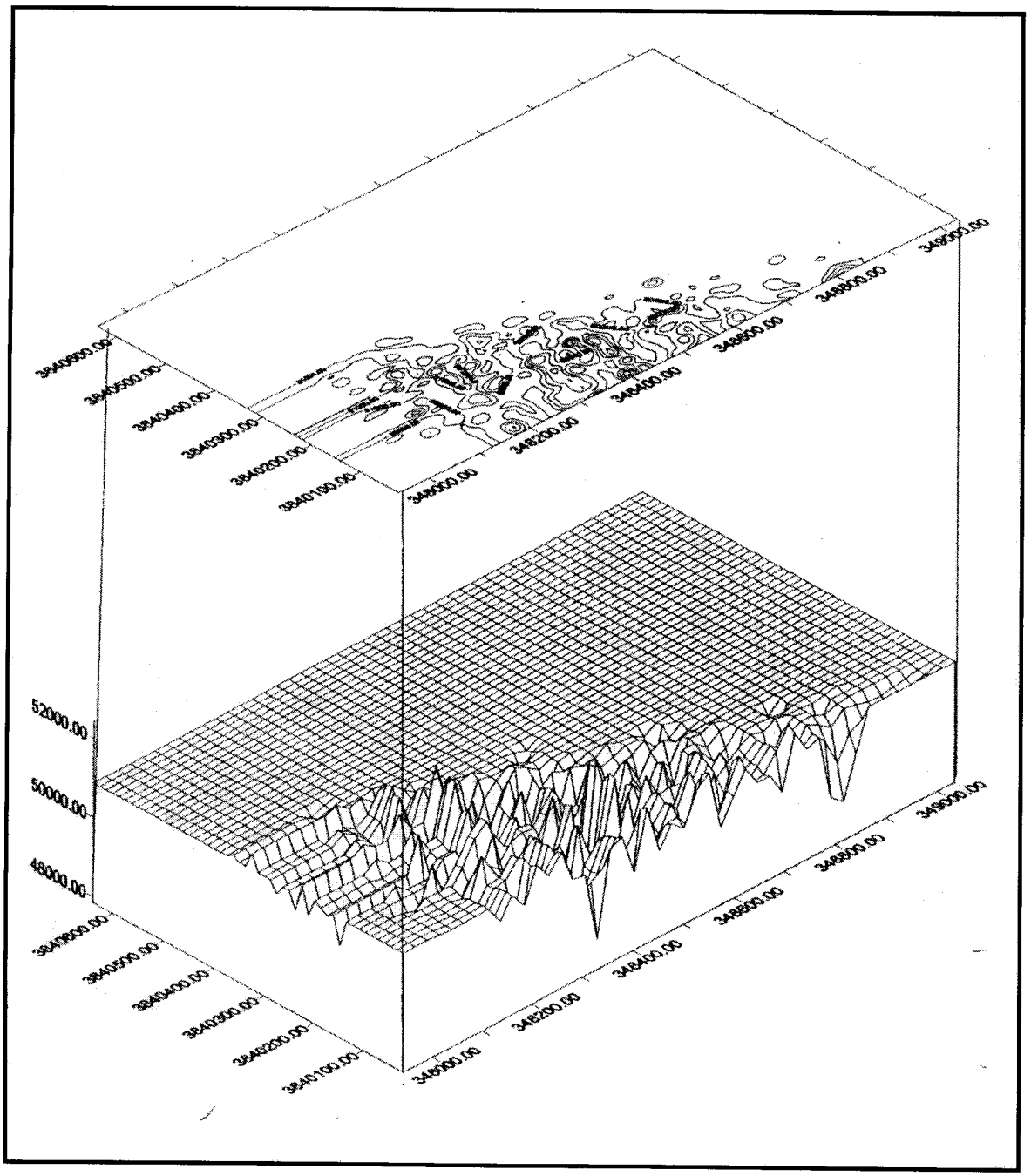

Figure F.2. Thursday magnetic contour and surface plot, Area 3.

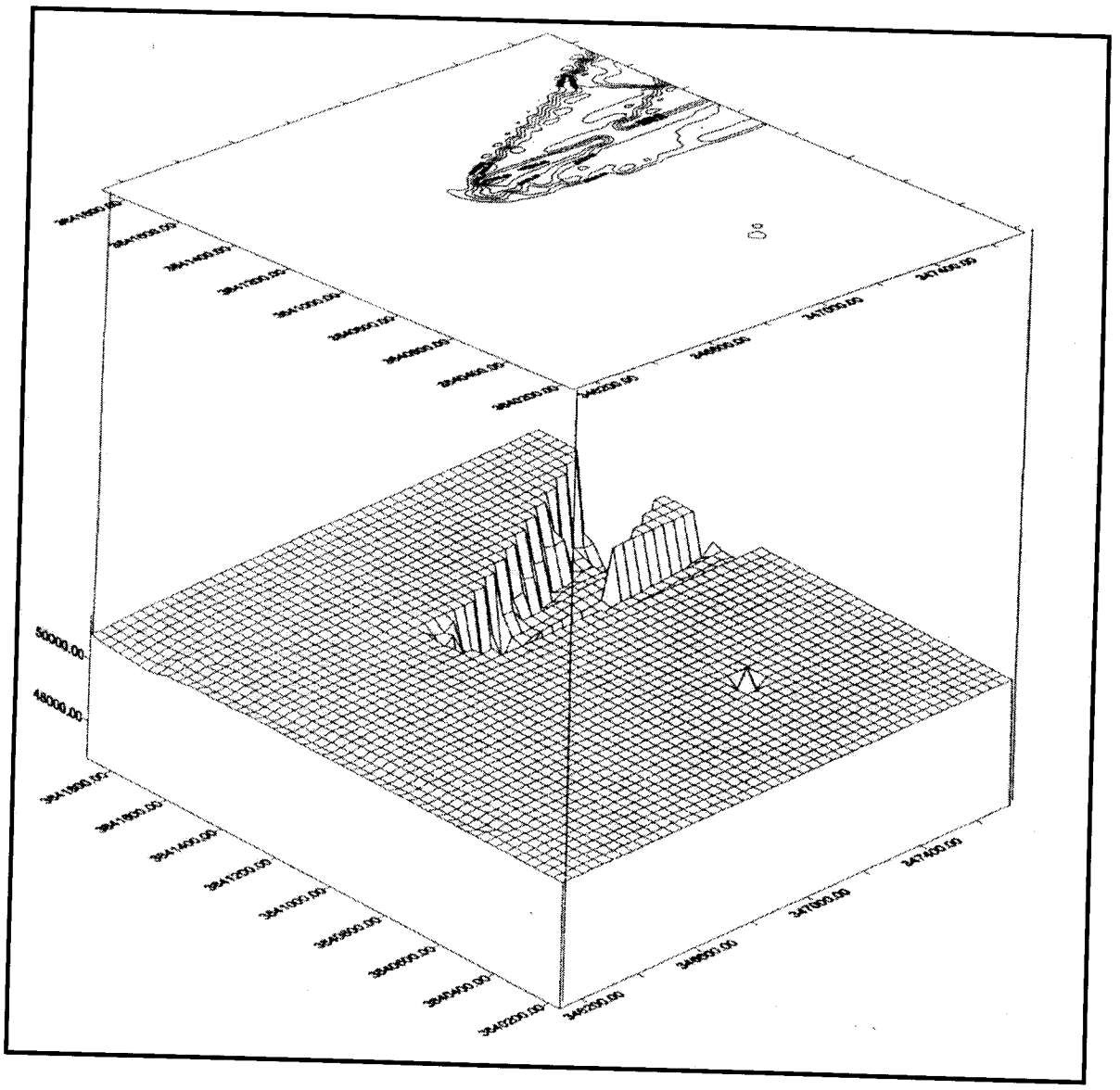

Figure F.3. Friday magnetic contour and surface plot, Area 4.

Appendix G

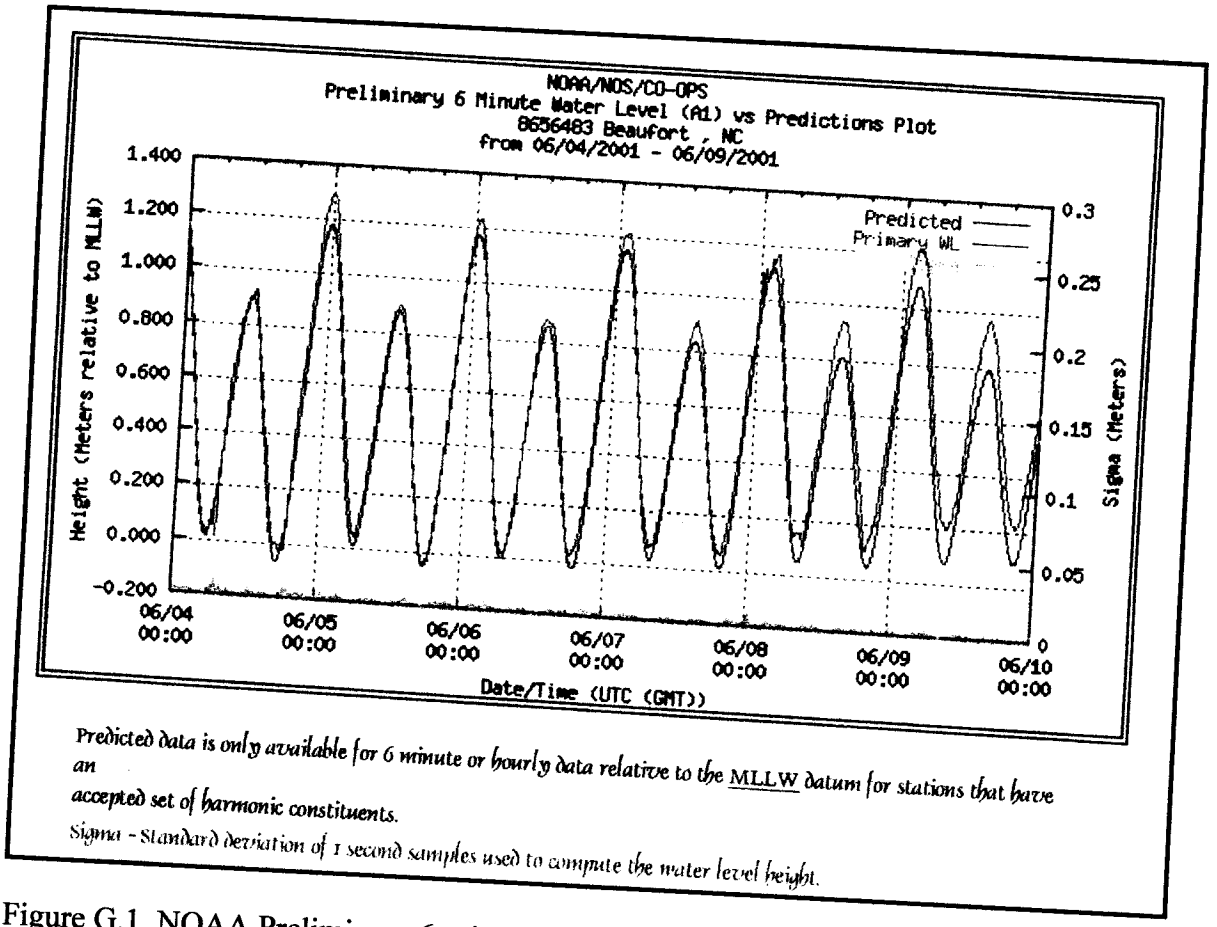

Figure G.1. NOAA Preliminary 6-minute water level vs. prediction plot, June 4-10 2001.