

Abstract  
“DASH AT THE ENEMY!”:  
THE USE OF MODERN NAVAL THEORY TO EXAMINE THE BATTLEFIELD AT  
ELIZABETH CITY, NORTH CAROLINA

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Immediately following the Union victory at Roanoke Island (7-8 February 1862), Federal naval forces advanced north to the Pasquotank River and the town of Elizabeth City, North Carolina where remnants of the Confederate “Mosquito Fleet” retreated. The resulting battle led to another Union victory and capture of the Dismal Swamp Canal, thereby cutting off a major supply route for the Confederate Navy from the naval yards at Norfolk, Virginia as well as destroying the Confederate fleet guarding northeastern North Carolina.

The naval tactics used in the battle at Elizabeth City have been previously examined using the documentary record; however, little archaeological research has been undertaken to ground truth interpretations of the battle. The present study is an archaeological analysis of the battle using the same framework used by the American Battlefield Protection Program, a military terrain analysis called KOCOAA. Since the KOCOAA framework was developed as a means to analyze terrestrial battlefields based on modern military theory, questions arise as to whether a traditionally land-focused paradigm is the best way to analyze and understand naval engagements. Hence, the present study considers amending the KOCOAA foundation by integrating modern naval theories used by the United States Navy into analysis of a naval battlefield.



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ELIZABETH CITY, NORTH CAROLINA

A Thesis Presented to the Faculty of  
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Master of Arts in Maritime Studies

By  
Adam Kristopher Parker

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## Dedication

This thesis is dedicated to my grandmothers, Gladys Kline and Doris Parker, and of course, my mother, Sally Parker.

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Thanks for this thesis go, first and foremost, to Dr. Nathan Richards for guiding me along the way and teaching me how to be a better scholar and field researcher. None of this would be possible without his help. Further thanks go to my committee members for explaining theory and historiography details with me. Thanks also need to go to East Carolina University's Water and Dive Safety Office and Mr. Mark Keusenkothen and their assistance in helping me get a boat to do field research and to UNC Coastal Studies Institute for allowing me to use their equipment. For assistance regarding any permit issues, thanks go to Mr. John Morris of the North Carolina Underwater Archaeology Branch and his patience in dealing with students. Further thanks go to Mr. Greg Stratton and Mr. Ryan Bradley for their assistance in the fieldwork. Finally, thanks go to Elizabeth City's Mr. Bruce Long for assisting me with historical research when I first began this project.

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## Chapter 1 Introduction

### Introduction

On 27 April 1861, eight days after issuing the first orders for a blockade of the ports in the first six insurgent states, President Abraham Lincoln extended the naval blockade to include ports in Virginia and North Carolina. General Winfield Scott developed the plan as the main Union strategy for strangling the Confederacy of arms, ammunition, and even food. The goal was to starve the rebel states into surrender; in essence, siege warfare on a grand scale at sea (Tucker 2006:79).

In response to the Union blockade, the Confederacy granted letters of marque to privateers and began smuggling both civilian and military materials across Union patrol lines. Within the first year of hostilities, blockade runners smuggled over 17,000 arms into the Confederacy (Webster 2010:318-320). With this looming threat to the success of the blockade, and because of the loss of the naval yards at Norfolk when Virginia seceded, Major General Ambrose Burnside was given command of an expedition to capture and occupy strategic locations along the North Carolina coast (Scharf 1887:386).

The expedition's first engagement was the Battle of Roanoke Island (7-8 February 1862). After two days of heavy shelling by the Union fleet under Flag Officer Louis Goldsborough, Union soldiers made an amphibious assault and the island fell (Scharf 1887:389-390). Survivors of the small Confederate fleet steamed back to Elizabeth City, at the southern end of the Dismal Swamp Canal that connected with Norfolk, to resupply and to plan for another engagement with the Union fleet. Flag Officer William Lynch was forced to change his plans when news of the island's surrender reached him. On 9 February 1862, the Confederates sighted the Union gunboat flotilla under Commander Stephen Rowan. The next day, 10 February, the two fleets met. Within

fifteen minutes, all the Confederate vessels were captured, sunk or forced to retreat, eliminating the small fleet guarding North Carolina's waters (Lynch 1862:594-597). With the capture of Elizabeth City, Federal forces cut communications between Norfolk and North Carolina by way of the Dismal Swamp Canal. At the same time, the Union took a port from which to launch further attacks (Scharf 1887:393-394).

Reconstructions of the tactics employed at the Battle of Elizabeth City have relied heavily on the documentary record. Archaeologists have conducted little field research concerning the battle, most significantly documenting CSS *Black Warrior* and CSS *Appomattox*, two of three shipwrecks associated with the battle (Lawrence and Henry 2002; North Carolina Department of Cultural Resources 2009). The present study proposes to reconstruct the tactics employed during the engagement through archaeological survey and analysis with Geographic Information Systems (GIS) software. The framework used to conduct the survey and analyze tactics will be the KOCOAs framework used by the American Battlefield Protection Program (ABPP). The ABPP is part of the United States Department of Interior's National Park Service, and the main agency involved with the documenting battlefields. The ABPP requires all reports to be completed using the KOCOAs analysis framework.

KOCOAs is a terrain analysis that examines a battlefield's landscape to recreate a battle's tactics and document the extent of the battlefield to assess the preservation and protection measures needed. Its use has been primarily on terrestrial battlefields (see for example Heckman 2009; Johnson 2009; Kuttruff 2009; Laumbach 2009; Mandzy 2009). It has also been applied to naval battle sites (Lydecker 2006; Babits 2010; McKinnon and Carrell 2011; Bright 2012; Simonds 2014) which lack many of the landscape features a terrestrial site would have. Due to the differences in the landscape of a naval battle, when KOCOAs survey frameworks have been

applied to naval sites, several principles have had to be redefined to fit the survey needs (Babits 2010:3-4; McKinnon and Carrell 2011:151).

KOCSA has been successful in documenting terrestrial battlefields due to its origins from the operational military acronym OCSA. The elements of the acronym remain the same (and are discussed further in Chapter 2). The framework is open to amendment with naval theory to effectively document a naval battle using a framework like KOCSA. The present study conducts a KOCSA survey of the Battle of Elizabeth City while incorporating *modern naval tactical theory* (MNTT) to create a framework that allows for more effective documentation of naval battle sites. MNTT is an acronym created for this document to represent a range of documents known as Naval Doctrine Publications (NDP) (see for example United States Navy 1994).

#### Elizabeth City before the Civil War and its Strategic Importance

Today, Elizabeth City is the county seat of Pasquotank County as well as the largest town in the largely rural area of northeastern North Carolina (Figure 1), but it does not rival the size of other North Carolina cities such as Raleigh, Charlotte, or Winston-Salem, nor do its port facilities match those of Wilmington. This was not necessarily the case on the brink of the Civil War. To understand Elizabeth City's strategic importance, it is necessary to examine the city's development during the antebellum period.

Northeastern North Carolina is an area which Alex Meekins (2007:11) describes as, “fertile river country.” Water dominates the region in the form of rivers, swamps and the Albemarle Sound. These waters provided the fastest means of travel and facilitated trade networks in the area were some of the major reasons the area became a target in the Civil War. Control of the waters ways that fed into the Albemarle Sound provided control of the entire region (Meekins 2007:11).

Before 1830, residents of the region needed access to a deep-water port. Beyond the rivers and sounds, inlets that allowed access to the ocean among the Outer Banks were shallow and dangerous for vessels any larger than sloops or schooners. The major shipping inlets were in Pamlico Sound to the south; the inlets in Albemarle Sound allowed only shallow draft vessels access to the Atlantic Ocean (Brown: 1981:10). This hindered the region's overall trade network by isolating North Carolina merchants and farmers from larger markets unless they used expensive overland methods of export. Thus, in the 1780s and 1790s, legislators called for the creation of a canal that would allow northeastern North Carolinians access to the deep-water port at Norfolk, Virginia. This led to the construction of the Dismal Swamp Canal, with improvements continuing until 1828 (Brown 1981:3; Meekins 2007:11-13).

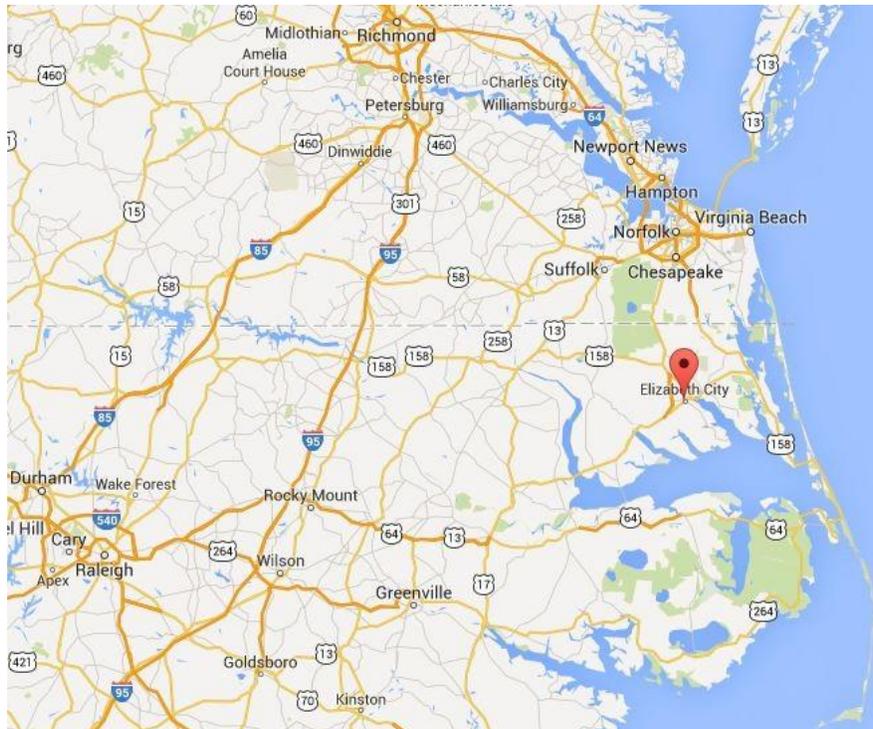


Figure 1: Location of Elizabeth City, North Carolina (Google Maps 2015, Map data by Google, Accessed 5 June 2015).

The Dismal Swamp Canal made extensive use of already existing rivers and creeks. The northern terminus was the Elizabeth River in Norfolk, Virginia. From those waters, it ran through the Great Dismal Swamp, connecting Deep Creek, Virginia, to South Mills, North Carolina. At South Mills, a series of locks assisted boats in navigating the canal. From South Mills, the canal followed the headwaters of the Pasquotank River to Elizabeth City, the southern terminus of the canal (Meekins 2007:12).

Much of the Dismal Swamp Canal followed existing rivers and creeks, and travelers immediately began regarding it as tedious and lengthy. By the mid-19th century, technology progressed and construction of a new canal began. In order to facilitate an easier and faster passage for vessels, the Albemarle and Chesapeake Canal was finished in the late 1850s. This canal began in the Elizabeth River at Norfolk as well. Instead of proceeding south, the Albemarle and Chesapeake Canal went east following a branch of the Elizabeth River to North Landing, Virginia. From there, the canal went south, following the North Landing River to Currituck Sound and then passing through the Currituck peninsula to the North River where it met the Albemarle Sound just south of Coinjock, North Carolina (Brown 1981:2, 9-10).

While the Albemarle and Chesapeake Canal facilitated easier travel from Norfolk to northeastern North Carolina, because it opened in the late 1850s, Coinjock did not see the economic development that Elizabeth City undertook as the southern terminus of the Dismal Swamp Canal. The surrounding region remained largely rural; however, Elizabeth City was able to grow economically, keeping the region from becoming completely isolated. Elizabeth City tied the region to a larger economic market, and even became noted for building ships for the West Indies trade. As improvements in the Dismal Swamp continued throughout the early 19th century, Elizabeth City grew in economic importance, eventually replacing Edenton, North

Carolina, on the Chowan River, as the main river port for the Albemarle region (Meekins 2007:11).

By 1860, with a population of 1,798, Elizabeth City had become North Carolina's eighth largest city. This included the fifth largest population of free blacks in North Carolina. The 1860 presidential election showed that the consensus of the population was that they did not wish to sever commercial ties with the Union unless President Abraham Lincoln coerced the southern states. They developed a “watch and wait” attitude as rumors of war began circulating. John Scharf states that the population was, “if not actually hostile to the Confederate cause, then so indifferent to its success, as to avail themselves of the first and every opportunity to evade the duty of defense...” (Scharf 1887:369). During this time, many legislators maintaining the watch-and-wait mentality lost their seats in the state legislature (Meekins 2007:15-16).

South Carolina fired on Fort Sumter on 15 April 1861 and President Lincoln called upon North Carolina to raise two regiments of troops to assist in putting down the rebels in a telegram to Governor John Ellis the same day. Governor Ellis questioned the telegram’s authority, stating, “... I regard the levy of troops made by the administration for the purpose of subjugating the states of the south is in violation of the Constitution and a gross usurpation of power... You can get no troops from North Carolina” (Tolbert 1964[2]:612). With the secessionists in control of the state legislature, on 20 May 1861, North Carolina representatives unanimously voted to secede from the United States, although this unanimous decision can be called into question as many northeastern North Carolina Unionists had lost their seats (Meekins 2007:16).

Elizabeth City's shipyards, the city’s proximity to two major canals leading to Norfolk and importance as a major river port in the Albemarle region made it one of the most strategic targets in northeastern North Carolina. If Union forces could take a port on the Albemarle Sound

system, they would essentially control all navigable waters of the North, Pasquotank, Perquimans, Chowan, and Roanoke Rivers (Scharf 1887:368-369). Furthermore, because the consensus of residents in northeastern North Carolina was not to sever ties with the Federal government, support for the Confederate cause was low in the area. If Federal troops could take control, they could raise troops from the area and use the fertile lands to feed them. Therefore, after the Battle of Roanoke Island (7-8 February 1862), Elizabeth City and the greater Albemarle Sound region were the next logical Union strategic goals in the area.

### Objectives

The primary objective of the present study was to complete a multidisciplinary study of the Battle of Elizabeth City using historical, geospatial, and archaeological data. A secondary objective was to include an MNTT analysis of the battle in conjunction with KOCOA and METT-T analyses and determine its merits as a theoretical framework for future studies of naval battlefields. The primary objective was achieved by first using primary source documents to create a visual model of the battlefield in Geographic Information Systems (GIS) software. This model was a core element to the study, as it guided the three analyses and interpretations based on historical data as well as archaeological survey. The archaeological element consisted of a remote sensing survey to locate and identify targets associated with the battle and narrow down the primary engagement areas.

The secondary objective was accomplished by examining the battlefield and commander decisions through the lens of the METT-T, KOCOA, and MNTT frameworks. The resulting interpretations were then compared and contrasted so that the merit of each could be discussed concerning the study of naval battles.

## Research Questions

### *Primary question-*

Can the application of MNTT within the KOCO/METT-T framework result in more efficient reconstruction of the tactics employed as well as documenting of the military landscape of a naval engagement, specifically the Battle of Elizabeth City?

### *Secondary questions-*

How does the geographic proximity to terrestrial features affect naval tactical theory?

How do weapon and vessel technological development affect naval tactical theory?

Can changes in tactical theory be quantified archaeologically using KOCO/METT-T survey?

## Thesis Structure

This thesis consists of seven chapters. Chapter 1 is the introduction, which describes the importance of the present study, gives a brief historical outline as to why Elizabeth City was a strategic target, reviews previous works, and defines objectives and research questions. Chapter 2 discusses the theoretical foundations of battlefield archaeology, the rise of KOCO as a national standard, analyzes KOCO's use for studying naval engagements, and finally describes MNTT. Chapter 3 is a general historical narrative that sets the stage for the Battle of Elizabeth City by reviewing the state of both the Union and Confederate navies at the beginning of hostilities and the significant factors that ports played in the war. Following this, the Battle of Hatteras Inlet, the threat posed by North Carolina's defense fleet, and the Battle of Roanoke Island are discussed. Chapter 4 describes the methodology used for the study beginning with historical research and then discussing the creation of the GIS model, the magnetometer modeling process, and finally the remote sensing and data processing methodology. Chapter 5 discusses all available datasets, first giving a detailed historical narrative of the battle, and then discusses both magnetometer and

side scan datasets. Chapter 6 first defines the battlefield's perimeters before applying each analysis framework, METT-T, KOCOA, and MNTT to the collected datasets, interpreting each simultaneously, and ends by comparing and contrasting the three frameworks. Chapter 7 brings the data together to answer the research questions posed above and addresses the shortcomings of the study and suggesting future research possibilities.

## Chapter 2 A History and Theory of Battlefield Archaeology

### Introduction

This chapter will explore the theoretical background of the present study's research questions. The chapter will begin with a brief overview of the merits of battlefield archaeology. An examination of historical military theory in a terrestrial context will follow. The next section will look at how the standardization of the Principles of War influenced the development of METT-T and KOCOA. Studies of naval battlefields in which KOCOA has been applied, including those undertaken by Lawrence Babits (2011), Jennifer McKinnon and Toni Carrell (2011), have noted problems with adapting terrestrial focused KOCOA to naval battlefield surveys. These problems in theory will be discussed before examining historical naval theory.

In order to amend the KOCOA framework with Modern Naval Tactical Theory (MNTT), historical naval theory must be examined in much the same way that previous studies have linked KOCOA's theoretical foundations in historical military theory (see Babits 2011). Understanding how historical military theory influenced the development of KOCOA is paramount for understanding its theoretical strengths. In the same fashion, historical naval theory needs to be analyzed to understand the development of MNTT and determine its theoretical strengths and foundations as well its potential as a tool for study of naval battle sites by placing the battle in its historical context. After the discussion of historical naval theory, MNTT will be explained as outlined by the Naval Doctrine Publications (1994) and further commented on by Lieutenant Commander Gary Cooper (1995) and Captain Wayne Hughes (2000).

### Merits of Battlefield Archaeology

Before the 1980s, few scholars took the study of battlefields as a serious sub-discipline in archaeology. Speaking on the issue in 1969, Ivor Noël Hume stated:

Little can usefully be said about battlefield sites. If one side had time to dig in, we may be left with the remains of fortifications...; if not, the site will have little to distinguish it, except perhaps some graves and a scatter of hardware that can best be salvaged by using a metal detector. There can be no meaningful stratigraphy (as far as the battle is concerned), and the salvage of relics becomes the be all and end all (Noël Hume 1969:188).

Richard Fox and Douglas Scott (1991) challenged this view in the 1980s during their investigation at the Little Big Horn Battlefield (discussed later in this chapter). Since then, and especially in the new millennium, battlefield archaeology has become a rising sub-discipline of historic archaeology.

One of Noël Hume's biggest arguments against the systematic study of battlefields was due to the influence of relic collectors on battlefield sites, most notably removing any material evidence from sites (for example spent ammunition, buttons, or belt buckles) for their personal collections. This argument was countered by Potter et al. (2000:13) in that the majority of relic collectors using metal detectors search areas at random, rather than systematically. In opposition, military action is, in essence, systematic killing between two belligerent factions. As such, warfare constitutes one of the most organized and patterned types of human behavior; warfare is anything but random actions. Due to the highly systematic nature of warfare, even if a collector did find a large concentration of artifacts at random, densities are often too great to remove all traces of combat completely. Even if archaeologists cover 100 percent of a site (which is nearly impossible even at the most well surveyed sites), 100 percent coverage does not equate to 100 percent recovery.

Philip Freeman further commented on the use of archaeology to study battlefields. He stated that battlefield archaeology is potentially useful as a way to embellish historical accounts of a battle and to strengthen previous narratives or diminish others in the case of conflicting accounts or to shed light on engagements that have poor documentation (Freeman 2011:149).

These arguments are necessarily particularistic in nature, in determining how site classifications and artifact typologies fit within a chronological context in the history of warfare. Once contextual relationships between typologies and site chronology are established, larger questions can be asked about broad aspects of human behavior such as trade, religion, or in this case, warfare. Scott and McFeaters (2011:105) state that, “Conflict studies have resolved most basic methodological issues as well as artifact typologies and chronology; it is now entering the explanatory phase of growth as a discipline.” Additionally, “more could be done, addressing such issues as cultural patterns, human activities, and behaviors associated with conflict” (Scott and McFeaters 2011:105).

Richards et al. (2011:26) also make the same observation as Scott and McFeaters, in that, “... Many of the particularistic, forensic, and experimental studies... have had to occur in certain historic contexts in order to more adequately link historic events into a coherent chain using archaeological data (Richards et al. 2011:26). However, they explain that the approaches Freeman gives are “fraught with problems for the researcher.” This is due to the implicit biases influencing battle interpretations absent a theoretical framework. Without an explicit framework, battlefield studies tend to run along antiquarian lines (Richards et al. 2011:25). Sutherland expands upon this by stating that battlefield archaeology is a misnomer of sorts. It is not the field upon which the battle occurred that is the focus of the study; rather, it is the event of the battle itself under scrutiny. As such, with a proper framework, not only can battlefields and major conflicts be studied, but also skirmishes between government forces and civilians in periods of civil unrest. This has further been developed in the related field of conflict archaeology (Pollard and Banks 2005:vi; Sutherland 2005:2).

Despite battlefield archaeology’s beginning as an antiquarian tool to reinforce otherwise

well-known historical narratives, it has grown to allow generalist questions to be asked. These questions can involve issues in the preservation of battlefields, the lives of civilians during wars, soldiers' life in camps, or why commanding officers used certain tactics in the course of fighting. As Conlin and Russell (2006:21) note, "Battlefield archaeology can give unique insight into the anthropology of war (one of the most pervasive aspects of human society) and can provide data on how decisions are made in the heat of battle."

#### Battlefield Archaeological Theory and KOCO A

As Potter et al. state, "The actions of military units on a battlefield are based on the tactics of the prevailing military wisdom of the day; *they are not random*" (Potter et al. 2000:13, original emphasis). In addition, while it is important to note here that battlefield archaeology studies are conducted within a framework related to modern tactics, it is also important to understand a battle and its place and role in a campaign's strategic goals and aims, as no battle happens in isolation. Babits (2011:5) explains the difference between strategy and tactics: "Strategy is the overview and planning for campaigns and wars... Tactics is the term used for... the application of the plan, in conjunction with the available weapons and troops." In other words, strategy dictates the goals and objectives of a campaign or entire war. In the field, tactics dictate that plan's execution in an engagement. The development of military strategy led to the development of tactical doctrines (for example, the American Principles of War led to development of METT-T and KOCO A). Elizabeth City's strategic importance led to the battle happening following Roanoke Island's surrender while circumstances on the battlefield led to the specific tactics being employed.

The development of theoretical frameworks for studying battlefields archaeologically started in the 1980s with Fox and Scott's multi-year investigation of the Little Bighorn battlefield

(June 1876). Using a framework known as the Battlefield Pattern, which involved gross and dynamic patterning, they sought to introduce a framework in which several different battlefields throughout history could be systematically studied. With this framework, they believed they would be able to define spatial and temporal aspects of battles, using historical narratives to direct the archaeological investigation (Fox and Scott 1991:92).

The Battlefield Pattern derived from historical archaeology theories about behavioral patterning. These patterns are expressed through the cultural norms and values of an individual in a given time period. As military behavior is very ordered and defined, tactics then represent patterned behavior. Fox and Scott do make note that individual behavior occurs on behalf of the military unit and can therefore be seen as a reflection of unit behavior over space and time (Fox and Scott 1991:92-93).

The archaeological data are then viewed at two different levels: gross patterning and dynamic patterning. Gross patterning gives a low resolution idea of what was happening at certain areas in the battlefield. These are largely seen through artifact clusters that may be a group of spent ammunition cartridges, fired projectiles, military hardware such as bayonets, or personal effects such as buttons or belt buckles. Larger archaeological features such as rifle pits or earthworks may also figure at this level of investigation. Gross patterning analysis cannot typically stand alone in helping identify battlefield behavior. It only shows where action occurred and where troops were during a battle. It is dependent on the fit between history and archaeology and discrepancies between the two (Fox and Scott 1991:94).

From artifact clusters and feature locations, dynamic patterning can then be used to ascribe behaviors to individuals or units. This is done through firearms analysis. Due to minute differences in every firearm's firing mechanism, individual weapons can be identified. From this

data and the location of either spent ammunition casings or fired bullets, a specific individual's position may be identified. Features at a site can then be combined to examine unit behavior. Such evidence can define a unit's movements through time. Meanwhile, gross patterning can place the unit at a point of spatial reference to other units on the battlefield. Combining both dynamic and gross patterning methods, evidence of an advance or retreat can then be seen. Alternatively, if there are no discrete signatures, it may represent a breakdown of military organization on the battlefield. The authors do note that when dealing with armies, a vast knowledge of firearms is necessary for this framework to work, as there are some cases where opposing forces do not differ greatly in the firearms being used or where one force may be using captured weapons (Fox and Scott 1991:94-97).

From their investigation of the Little Bighorn battlefield, Fox and Scott were able to define the positions of both the American cavalry and the Native Americans. Using the historical data, they were able to show that cavalry tactics of the time were largely as offensive support to infantry operations. After the American cavalry was pinned down without infantry support, they had few established defensive tactics to use. Because of the limited combat communications at the time, the improvised defensive tacticals of the commanders were not relayed thoroughly (Fox and Scott 1991:101-102). They also showed that a battlefield could be studied systematically within a theoretical and methodological framework. Their study, by their own admission, was a particularist study (Fox and Scott 1991:92).

As noted above, particularistic approaches like the Fox and Scott study were necessary in order to gain a database of material culture evidence and historical contexts for a variety of battles. Not all battlefield studies were organized with this framework in mind. Many studies continued to be merely descriptive in nature as Scott et al. discuss:

Today there are a plethora of archaeological reports in the literature dealing with the results of investigations at military forts, camps, prisons, and battlefields... Many of the investigations have had little or no theoretical orientation or explanatory goal above that set by an architect or interpreter. This statement is not made as a negative criticism... it is a statement of fact made with the knowledge that, until recently, the archaeological study of military sites has had a limited research orientation (Scott et al. 2009:1).

By the 1990s, a new framework was being used, first by the Civil War Sites Advisory Commission (CWSAC). This framework was later adopted by the American Battlefield Protection Program (ABPP) and amended in 2000. This is a framework known as KOCOA (or OCKOA in military manuals, where the shift in their order reflects how an archaeologist or preservationist may view a battlefield differently than how a commanding officer would during the engagement) and it is currently required of all battlefield surveys funded by the ABPP (Lowe 2000:1; Babits 2011:7).

The KOCOA framework is founded on modern military tactics. The same foundational theories also formed the basis for military principles taught by the United States Army during the 20th century as well (Bright 2012:29). Currently, the United States Army teaches nine principles of war: objective, offensive, maneuver, mass, economy of force, unity of command, security, surprise, and simplicity. These principles are used to examine a battle from a military standpoint and determine why an action was carried out and what the enemy's response to the action was. Furthermore, these principles enhance an understanding of operational and tactical combat details (Babits 2011:10). The nine principles are defined as:

**Objective:** This is the goal of the military operation and should be clearly defined and attainable.

**Offensive:** The initiative of the battle. It is what allows for an army to continue forcing the enemy to react to their will and choosing the pace of the battle.

**Maneuver:** The ability to place the enemy at a disadvantage by exercising military strength.

**Mass:** Mass refers to superior combat power. It is not simply defined as more troops.

Instead, it refers to troops and weapons available and how they are deployed in the field.

**Economy of Force:** While commanders are taught to mass their forces, they are also taught to retain enough forces for secondary actions. Commanders should employ enough of their forces to complete a task in order to maximize available resources.

**Unity of Command:** This refers to the idea there is a single authority figure and that all subordinates are working to achieve the same objective as this commander.

**Security:** This is the denial of initiative to the enemy by not allowing classified information fall into their hands or preventing surprise actions.

**Surprise:** Engaging the enemy while they are unprepared for battle or before they are able to react effectively.

**Simplicity:** All objectives and orders are clear, concise, and uncomplicated (Babits 2011:10-12).

The United States Army further condensed these nine principles to simplify how an officer should think tactically before an engagement (Babits 2011:6). This simplified system is known as METT-T. METT-T stands for Mission, Enemy, Terrain, Troops available, and Time available. The United States Army defines each term as the following:

**Mission:** The leader considers the mission given to him and contemplates the commander's intent two command levels higher and decides the essential tasks needed of his unit to achieve the mission goals.

**Enemy:** The leader considers the type, size, organization, tactics, and equipment of the enemy expected to be encountered. The leader identifies the greatest weakness of the enemy and the greatest threat posed to his unit.

**Terrain:** The leader considers the effect of terrain and weather on the movements of the enemy and friendly forces through the guidelines of OCKOA [KOCOA].

**Troops Available:** the leader considers the strength of subordinate units, the characteristics of his weapons systems, and the capabilities of attached elements as he assigns tasks to subordinate units.

**Time Available:** The leader refines the allocation of time based on the tentative plan and any changes to the situation (United States Army 1992: 2.8-2.9).

The METT-T analysis states what military officers must take into consideration prior to an engagement as far as the most relevant categories of issues that must be dealt with at the tactically. As can be seen, KOCOA is a subset of this larger analysis dealing directly with terrain analysis. In military terminology, terrain refers to natural geographic features that either benefit a unit during an engagement or put it at disadvantage. This is different from the archaeological phrase "landscape" which includes all features at a site, regardless of military usefulness

(Carman and Carman 2009:42).

KOCCOA is stands for a grouping of five concepts: Key terrain, Obstacles, Cover and concealment, Observations and fields of fire, and Avenues of approach (Lowe 2000:7). Each term is further defined as:

**Key Terrain:** Ground, typically high ground, which offers an offensive advantage or by occupying it denies the enemy that advantage. A leader considers the key terrain in selecting objectives, support positions, routes in the offense and the positioning of units for defense.

**Obstacles:** Terrain features that restricted, delayed, or prevented troop movements. If on the defense, a leader may consider how to use obstacles in order to delay or prevent the enemy from advancing on the unit's position.

**Cover and Concealment:** Cover is a terrain feature which may protect from enemy fire. Concealment is protection from being sighted. Cover protection may consider both direct and indirect fire to be protected from and may be a hill's crest or stone fence.

Concealment must not only take into consideration ground scouting, but also aerial scouting as well.

**Observations and Fields of Fire:** Observation is the ability to utilize the terrain to observe the enemy without being seen. Terrain that is not necessarily key terrain may be exploited for this purpose. Fields of fire considers the weapons available to an officer, maximum range, effective range, and requirements for grazing or anti-armor fire. This was to effectively minimize "dead ground" or ground that could not be observed or fired into.

**Avenues of Approach:** These are mostly tied to transportation networks. A leader considers which approach will offer a unit the most protection while placing the unit at the enemy's most vulnerable position. This may also alternatively be applied to retreats in considering which avenue will offer the most cover for an effective retreat to minimize losses (United States Army 1992:2.8; Lowe 2000:7).

In essence, KOCCOA surveys are heavily influenced by Antoine Henri Jomini's military theories in that he defines strategy as "the art of making war upon the map" (Jomini 1862 [1838]:62).

Furthermore, as Matheny (2001:3) points out, "For almost all the 19th century, strategy...

amounted to the selection of the theatre of operation, the base of operation, the line of operation, and decisive points...Jomini's major contribution, then, was to provide the geometry of the

battlespace." In the same way, KOCCOA focuses on the geometry of the battle space and

importance put on lines of communication (avenues of approach in this sense) and places them in a tactical doctrine for officers to follow and utilize.

The ABPP is first and foremost, interested in the protection of battlefields for preservation and education purposes (Lowe 2000:3). Simonds notes that because of this, most ABPP funded surveys have focused on describing the terrain “features on the modern landscape that would have been historically significant at the time of battle” (Simonds 2014:14). Even so, Bright states that the interaction between the combatants and the landscape represent a distinct set of human decision making processes and behavior (Bright 2012:30). By using KOCOAs as a battlefield archaeology framework, archaeologists are able to identify not only the cultural landscape of the site, but also the physical terrain features that military officers would have viewed and analyzed for exploitation during battle. Furthermore, because it is used as formal military doctrine in the United States Army, KOCOAs may also be used to examine tactics used on a battlefield more fully in relation to enemy forces and the landscape and why certain decisions were made over other possibilities. It allows a researcher to “view the terrain through a soldier’s eyes” (Lowe 2000:7). KOCOAs offers a framework to ask more generalist questions about the anthropology of war as opposed to Fox and Scott’s more particularistic approach.

#### Battlefield Archaeology and Naval Battles

While there have been archaeological surveys conducted of military shipwrecks and naval battlefields (see Watts 1998; Conlin and Russell 2006, 2011) this section will focus on those that have utilized the KOCOAs framework. Since 2005, the ABPP has funded several battlefield surveys of naval battlefields including Lydecker and James (2005), Babits (2011), McKinnon and Carrell (2011), and Richards et al. (2011), and most notable for the present study, John Bright's (2012) master's thesis. By examining these studies, the problems in applying the KOCOAs framework to naval battle sites becomes clear.

Lydecker and James’ study of Civil War operations on the Ogeechee River in Georgia

represents the first time the ABPP funded a survey of naval battle sites. It is therefore the first time KOCOAs theory and methodology were applied to maritime related battles. However, it has little theoretical bearing, as the authors do not discuss the theoretical framework. The goal of the project was to compile an inventory of submerged cultural resources without further research questions beyond documenting the battlefields that fell under the scope of the project. Thus no advance in theory was made and its inclusion here is only as a historical marker for KOCOAs use in naval studies (Lydecker and James 2005:i; Simonds 2014:5).

The first study to discuss the theoretical background of KOCOAs use in naval battlefields is Babits 2010 study of six battlefields from the Revolutionary War and the War of 1812. Babits tried further expanding on the KOCOAs framework by also examining battlefields through METT-T and Principles of War analysis. By using all three analyses, he argued that a better understanding of military practice could be done, not only based on the terrain, but holistically through the training soldiers would have received (Babits 2011:5-12). Simonds notes that despite this advancement in theory, Babits study focused more on the military history of the engagements instead of the human behaviors during battle. His interpretations did not extend to how the terrain influenced tactical decisions or how tactical training determined the course of fighting in each battle (Simonds 2014:17-18).

The next naval battle analysis funded by the ABPP was the Battle of Saipan (1944) (McKinnon and Carrell 2011:6-9). The major goal of this project was to create an underwater heritage diving trail that would include many submerged cultural resources from that battle, and so KOCOAs was used to define the battlefield (McKinnon and Carrell 2011:9-10). As such, KOCOAs was used as a tool for historic preservation of the battlefield, and its use as a framework was not expanded on theoretically.

Finally, the most recent ABPP funded project for a naval battle is Richard's et al.'s (2011) study of the Battle of the Atlantic off North Carolina's coast (1942) where John Bright's 2012 study applied the KOCOAs and METT-T frameworks to *U-576's* attack on Convoy KS-520. In this study, Bright used the theory expanded by Babits' 2011 study. However, instead of focusing on military history, Bright's study took a more anthropological approach to the theoretical framework and explained how the terrain and tactical definitions from METT-T influenced the decision making process during the battle. He also used the Principles of War as a way to explain behavior during the engagement and not just as a way to examine the tactics in a historical context (Simonds 2014:18).

Babits noted that the terms of KOCOAs must inevitably be changed in regard to naval battle. Key terrain is subtle in the coastal plain where a dune might increase visibility over tidal flats drastically. At the same time, navigable rivers and creeks must be also considered key terrain. Observation has little bearing on naval engagements because both terrestrial batteries and ships are highly visible at great distances. Fields of fire becomes more complex as they are dependent on a vessel's ordnance and whether the ship can bring those weapons to bear on the enemy. As with observation, cover meant little to naval engagements due to the high visibility and because any terrestrial bound unit would possibly have scouting parties monitoring navigable waterways. Ships themselves offered no cover for sailors and marines unless they were effectively ironclad (or later armored) while fortifications would offer cover from bombardment. Concealment may include masked batteries, natural growth along the waterway, or submerged obstacles, all of which may assist in creating or avoiding a surprise attack. Obstacles must be expanded to include the channel bottom itself and booms and snags. For terrestrial bound units, waterways themselves are obstacles as no charges could be made over the surface of the water.

Finally, avenues of approach could include merely “away from the water” for terrestrial units, and for naval units, the navigable channel becomes the avenue of approach (Babits 2011: 3-4).

Similarly, McKinnon and Carrell also noted problems associated with the application of KOCOAs to a long term, amphibious joint operations engagement. KOCOAs traditional application to Revolutionary War and Civil War battlefields analyzes sites that are bounded and defined. The engagements were also brief moments in time, lasting from one hour to a few days. Hand to hand fighting and close range artillery typically define combat that occurred. Thus, archaeologists who typically deal in this type of analysis deal with a short moment in time. The Battle of Saipan included several months of aerial bombing raids before the invasion force landed. After the invasion force landed, “it was not only approached and fought over land, but also in the surrounding lagoon and sea and within the airspace above... For these reasons, it is difficult to define areas based on direct hand to hand or close range combat over a brief period of time” (McKinnon and Carrell 2011:151).

Babits and McKinnon and Carrell highlight a large theoretical problem within KOCOAs. Because its basis lies in tactical doctrine adopted by the army and terrestrial military forces, it does not take consideration tactical differences that may be found in naval warfare or, for more modern periods, aerial warfare. Essentially, KOCOAs framework takes a terrestrially based paradigm and places those concepts on other forms of combat where different concepts may dictate combat tactics. Bright’s study did show that the expanded framework with METT-T and Principles of War analysis could be successful in documenting naval battles; however, it needed be applied continually to gauge its applicability and thus, Bright’s work forms the foundation of this study (Bright 2012:322-324). This study also seeks to amend KOCOAs framework with Modern Naval Tactical Theory (MNTT) for specific application in the study of naval battlefields.

## Historical Naval Theory

In order to amend KOCOAs with MNTT, it is necessary to understand historical examples of naval strategy and tactics in much the same way that previous studies have demonstrated KOCOAs merit by examining how it is based on historic military theory (Babits 2011:6; Bright 2012:29). These theoretical foundations form a historical context for naval theory therefore giving merit to MNTT's use as an archaeological framework.

Before the 16th century, fighting navies consisted of either galleys or round ships with fighting platforms. Galleys were rowed vessels used to ram other vessels then unleash boarders against the rammed vessel. Galleys were primarily found in the relatively calm waters of the Mediterranean from the time of the Greek city-states. They did not fare well in the rougher waters in Northern Europe. Since they were rowed vessels, they could not be used effectively against enemies a great distance away. Northern Europe on the other hand, developed round vessels sturdy enough to handle the rougher waters. These sailed vessels were fitted with tall fore and aft castles, from where soldiers and archers could fire projectiles down at the enemy (Palmer 2005:22-24).

Beginning with the wide spread use of mounted cannon on European ships by the 16th century, new tactics became available to captains. Konstam (1988:22) argues that cannon allowed for a more effective defensive tactic known as "stand-off firing". Captains, before an engagement would begin, would examine their enemy and decide whether they had the firepower to compete with the opposing vessel. If they did, they could then accept the fight. If they did not have near equal fire power, or if they did not have an advantage due to wind, they could choose to try and fend off the attacker by keeping up a rapid rate of fire, not allowing the attacking ship the opportunity to board (Konstam 1988:22-23). This can be seen during the Spanish Armada

Campaign of 1588. English vessels kept up rates of fire to prevent the Spanish ships from boarding them, as King Philip II had instructed. Instead, they had to go broadside to broadside against the English Navy (Martin and Parker 1988:192).

The first major work on naval fighting instructions are from Paul Hoste in 1697 (Hoste 1854 [1697]). This is the beginning of the tactical approach known as the “line ahead” formation. In this fashion, ships followed each other in a single line. With an advantageous wind, in the Age of Sail, this tactic would bring the most guns to bear on the enemy’s fleet. For the next century and a half, the line ahead formation dominated naval tactics, as seen at the Battle of the Nile (1798) and the Battle of Trafalgar (1805). Through time, a counter tactic known as “crossing the T” or “breaking the line” was developed to break up an enemy's battle linear formation by sailing perpendicular to the line, allowing both broadsides to bear and subjecting the enemy fleet to raking fire (Hughes 2000:74; Palmer 2005:173).

Despite the “crossing the T” counter tactic, the line ahead formation remained the dominant tactic in naval engagements. The advent of steam changed this, albeit slowly. By the time of the American Civil War, French, British, and American captains and strategists began developing new tactics to take full advantage of steam-driven vessels. Sir Howard Douglas (1858) and American Commander James H. Ward (1859) began discussing the changes in tactics that could be applied when steam powered vessels entered a battlefield. Given the ability to move independently of wind power and sails, Douglas advocated that a powerful fleet of steam vessels could turn more efficiently, close on an enemy, and board the opposing ship. Douglas also stated that steam would be more effective in inland waters where sailing vessels would have less room to maneuver as a fleet. These new concepts involving the use of steam in naval strategy and tactics were not isolated in Great Britain as Commander Ward's treatise is very

similar to Douglas' (Canney 1998:186-187).

Modern naval doctrine in the United States' Navy developed in the decades following the American Civil War. Rear Admiral Stephen Luce, after corresponding with General William T. Sherman during the war, concluded that the navy did not have a standard set of “principles of war” like the army did (although the army had not yet articulated the principles) (Matheny 2011:121). He lobbied several years for creating a naval war college and, in 1884, the institution was built in Newport, Rhode Island. Alfred Thayer Mahan was chosen to head the Naval War College. Over the course of his tenure at the Naval War College, Mahan sought to answer two important questions about naval theory: first, what was the purpose of a navy and second, how was it to be used (Matheny 2011:123)?

To answer the first question, Mahan drew upon history to illuminate the roles of past navies. His discourse, *The Influence of Sea Power Upon History 1660-1783* (1890), explained the purposes of navies during a period when naval sea power was paramount in the colonial Americas. In a later study, *Naval Strategy: Compared and Contrasted with the Principles and Practices of Military Operations on Land* (1911), he started addressing what Rear Admiral Luce was looking for: the fundamental differences between terrestrial and naval warfare. Mahan began describing naval warfare's “principles of war” in this volume as well (Matheny 2011:123-124).

Mahan found fundamental differences between terrestrial and naval warfare. These differences included obstacles in the terrain and strategic locations as well as the importance of battle. Where Mahan stated that the very land itself could be an obstacle, the sea is an “open plain” where many routes could be taken to avoid obstacles or enemy strategic locations (Mahan 1911:135-136, 212-213). Furthermore, in a posthumous publication, he stated in discussing the Russo-Japanese War that an engagement should have some strategic importance to be of any

value (Mahan 1918:136). Unlike terrestrial battle where depriving the enemy of soldiers is important, Mahan makes the argument that it is not the same to merely deprive the enemy of ships.

Under Mahan's direction, the Naval War College began examining principles of war directly involved in naval warfare. As early as 1895, they were drafting war plans under a framework called the estimate process. The estimate process was the birth of modern naval theory (Department of the Navy 1998:1-1). In 1900, the General Board of the Navy was created, and in 1907, the Naval War College began consulting the General Board of the Navy on war planning until 1915, when the Chief of Naval Operations took over such duties (Department of the Navy 1998:1-1-2). Mahan passed away in 1914, but students at the Naval War College continued developing naval strategy alongside the Chief of Naval Operations. In 1948, under direction from Admiral Spruance, the Chief of Naval Operations published the first official document of naval operational planning (Department of the Navy 1998:1-3). This document has gone through few changes and is known as NWP-501 (1998).

Despite the first publication of NWP-501 in 1948, naval doctrine remained something that was learned and no official doctrine for fleet commanders existed until 1994. This is when in a series of documents called the Naval Doctrine Publications were officially accepted as the doctrine of the United States Navy (Cooper 1995).

#### Modern Naval Tactical Theory

Of the Naval Doctrine Publications, Naval Doctrine Publication 1 (NDP-1) (1994) is the one that outlines the theory behind the doctrine. NDP-1 outlines a concept known as Operational Maneuver from the Sea (OMFTS). According to Cooper, OMFTS is a concept that United States Naval and Marine Corps forces will project power ashore from the sea in littoral (coastal)

regions of the world (Cooper 1995).

Maneuver warfare is defined as a concept that allows a commander freedom of decision-making and flexibility to adapt to the situation at hand. NDP-1 further defines maneuver warfare as “an indirect approach... Maneuver warfare requires us to project combat power... however, this power is focused on key enemy weaknesses and vulnerabilities that allow us to strike the source of his power- the key to his existence and strength as a military threat” (United States Navy 1994:33). This is opposed to the idea of attrition warfare, which is the projection of strength against an enemy who is simultaneously projecting strength until one belligerent is no longer able to replenish resources quickly enough to continue the fight. This is most notable in terrestrial battles where lines of soldiers fight one another until one side loses a large enough number of troops and cannot reinforce quickly enough, resulting in the line breaking. In essence, it is mutual slaughter until one side breaks (United States Navy 1994:33).

There is some debate between authors as to the nature of naval warfare. Cooper argues that maneuver warfare has been an unspoken institution in the United States Navy since the turn of the 20th century. The adoption of NDP-1 is a new concept only in joint amphibious operations between the navy and Marine Corps. Blockades represent an excellent example of maneuver warfare. Blockades deny enemy shipping to reach harbor and prevent them from massing an effective fighting force to combat the blockading vessels. In modern times, the United States’ blockade of Cuba during the Cuban Missile Crisis (October 1962) provides an example of maneuver warfare in action. In World War II, aircraft carriers were the power behind fleets, able to deploy long-range fighter or bomber aircraft. They were also the weakest armed, which is why an auxiliary fleet sailed with carriers as defense. Thus, during the war, aircraft carriers were the first targets for aircraft to target. If an aircraft carrier was destroyed, the primary long-range

fighting capacity of the fleet was gone leaving the defensive strength at the mercy of the fighting power from an enemy aircraft carrier (Cooper 1995).

On the other hand, Hughes argues the opposite. He states that all warfare at sea between fleets is inherently attrition based: “At sea the greater danger is of a misplaced faith in tactical cleverness... to base tactical success in outwitting, outmaneuvering, or outfighting a first class enemy is the height of folly” (Hughes 2000:28). He proposes that soldiers win wars and that determined soldiers with clever officers commanding them would not be defeated without bloody battle. In this, he assumes that all sailors will be equally matched in determination; “Forces at sea are not broken by encirclement; they are broken by destruction” (Hughes 2000:29). His assumptions do not consider the surrender of an enemy fleet. Mahan also seems to agree with this when he considered that the most effective strategy for defeating an enemy fleet was to concentrate firepower and go against the enemy head-on in attrition styled fighting. However, he also contradicts himself when he states in his essay on the Russo-Japanese War that merely depriving the enemy of ships does not guarantee sea control and thus advocates a maneuver-styled warfare by looking at the strategic value of targets (Mahan 1918:136; Cooper 1995).

Despite their differences about the nature of war at sea, both Cooper and Hughes agree when it comes to the purpose of a navy. Both state that purpose of a navy is to gain sea control and deny the enemy commercial or military use of the sea (Cooper 1995; Hughes 2000:9). Cooper states that this is the major difference between navies and armies: armies have possession goals whereas navies have use and denial-of-use goals (Cooper 1995). The concept is prevalent in NDP-1, “Control of the sea is fundamental to accomplishing our naval roles... By establishing control of the sea in every dimension... we open opportunities for power projection, insertion

and resupply” (United States Navy 1994:26).

Whether conducting amphibious joint operations or fleet-on-fleet actions, there are four concepts that define how the United States Navy is to fight to gain command of the sea and continue to operate in denial of use to the enemy. These four concepts are center of gravity, critical vulnerability, focus of effort, and main effort. NDP-1 defines the terms as follows:

**Center of Gravity:** This is something an enemy must have to continue military operations. It may or may not be strong in and of itself. There can only be one center of gravity. An enemy would need to continue to hold possession of the fortification in order to continue fighting. Once taken, the enemy’s war making capacity is threatened.

**Critical Vulnerability:** These are opportunities to access and destroy an enemy’s center of gravity. Decisive blows are made against objectives that affect the center of gravity and are still vulnerable to offensive action. Critical vulnerabilities support the center of gravity. Other examples, such as an enemy’s will to fight, may be time sensitive in vulnerability.

**Focus of Effort:** This is the paramount objective of the unit and is directed at the critical vulnerability that exposes the center of gravity. The responsibility of attaining the focus of effort is the main effort.

**Main Effort:** The main effort is a group or unit designated by the commander and is supported by all elements of the force. At one time, there is only one main effort and it is always directed at the focus of effort. The commander can re-designate the main effort during the course of battle. At any given time during the battle, the main effort may be comprised of the bulk of the force or a fraction of the force. No matter the size, the main effort is critical to the success of the mission and all other elements of the force must support it (United States Navy 1994:35-38).

Using an amphibious assault as an example, albeit a simplified one, the terms can easily be applied. If an enemy has a fortified position or naval base, it would be the center of gravity. That site would need to be sustained, and a supply route could be identified as the critical vulnerability (Figure 2). As a way to gain access to a position where the center of gravity can be eliminated, an amphibious assault to capture its supply route becomes the focus of effort. During the engagement itself, the main effort may be comprised of vessels shelling the enemy defensive positions along the supply route while an invasion force lands (Figure 3). At this point, the commander would switch the main effort to the invasion force itself, while the other elements,

such as the vessels from the first main effort, support the new main effort, for instance, with cover fire (Figure 4).

There are two final concepts to note in the maneuver warfare model of naval action. These are commander intent and tempo. Decisive action require unity of effort from all force elements. Rapid action, on the other hand, requires that those closest to the problem have the freedom to solve it as quickly as possible, leading to a large degree of decentralization. This is mitigated by way of understanding the commander's intent. The commander states the "end game" objective, described the estimated sequence of events, and issues mission-type orders. At the same time, initiative gives subordinates to act independently to a certain degree. No matter what, the commander's intent must be followed. Tempo refers to the pace of battle. It is the purposeful cause of dilemmas for the enemy. This forces the enemy to react to one threat while becoming increasingly vulnerable to other threats. At a certain point, if done correctly, the enemy will not be able to react to one threat without becoming completely vulnerable to another creating a no-win situation (United States Navy 1994:38, 40). By using these four major and two supporting concepts, the idea that naval action can be studied anthropologically through naval tactics becomes clear and attainable without forcing a terrestrial paradigm on maritime operations.

## Conclusion

The decentralized nature of naval tactics means that they differ greatly from the highly organized and regimented tactics found in terrestrial warfare. This serves to highlight a major difference between the two. Established theoretical frameworks in battlefield archaeology were discussed in the sections above and how they are able to serve as the backbone for the present study. The concepts inherent to maneuver warfare found in NDP-1 provide the foundation of

MNTT and how it can be used to amend the KOCOFA framework specifically for naval battles.

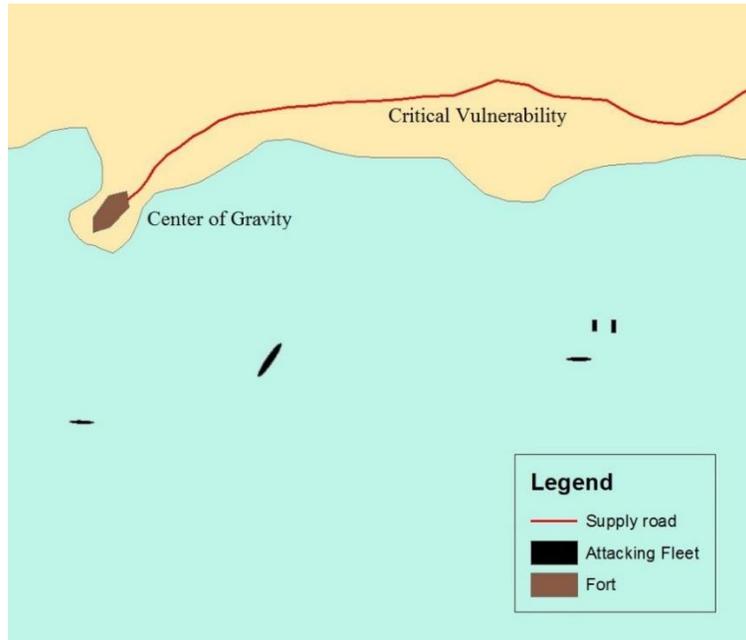


Figure 2: Example of a Center of Gravity and Critical Vulnerability (By Adam Parker).

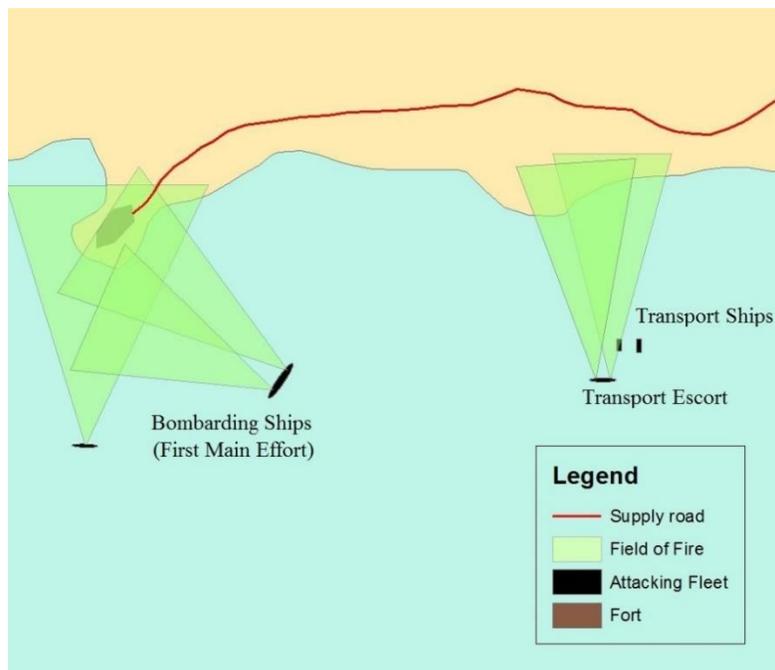


Figure 3: The Main Effort Begins Shelling the Enemy's Fortified Position (By Adam Parker).

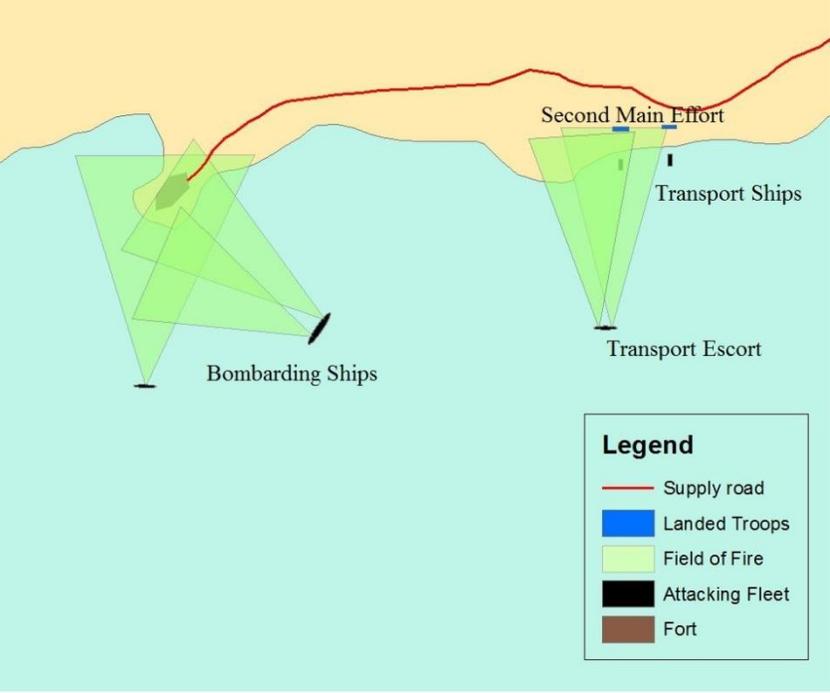


Figure 4: The Main Effort Switches to Supporting Landed Troops (By Adam Parker)

## Chapter 3 The Historical Prelude to the Battle of Elizabeth City

### Introduction

This chapter will discuss the historical narrative preceding the Battle of Elizabeth City. As secondary sources only briefly mention the battle as part of the aftermath of the Battle of Roanoke Island (7-8 February 1862) (see Tucker 2002:28-29, 2006:100; McPherson 2012:51), a detailed narrative of the battle itself will follow as Chapter Five. The Union and Confederate navies at the outset of the war will be discussed first. The chapter will then present the Battles of Hatteras Inlet, as this battle was the strategic Union victory that led to the development of the Burnside Expedition into eastern North Carolina. Flag Officer Lynch's Mosquito Fleet, as the only naval threat to the Union advance into eastern North Carolina, will be discussed. The Battle of Roanoke Island and the campaign lead up to the Battle of Elizabeth City will follow.

### Union and Confederate Naval Forces at the Beginning of the Civil War

This section will cover the state of both the Union and Confederate navies at the beginning of the Civil War. The state of both navies would ultimately determine how each was able to conduct naval operations throughout the war. While much of this section will present the ships at the disposal of both belligerents, it will also discuss the military geography aspect of ports and the ability to procure coal for steamers and victuals.

#### *The State of the Union Navy*

At the outset of hostilities, the Union Navy was not prepared to fight the war President Lincoln envisioned. The strategy developed by General-in-Chief Winfield Scott, later dubbed the Anaconda Plan, called for a blockade of all Confederate ports and an army of 80,000 soldiers to control the Mississippi River. Those soldiers were to be split into two columns, one to advance rapidly in transport vessels protected by gunboats in amphibious operations, with the second

following on land to secure victories (Scott 1861a:369-370; 1861b:387). The main strategy was to control all Confederate ports in order to strangle it of military and civilian supplies (Figure 5). On 19 April 1865, President Lincoln issued a proclamation to enact a blockade of the coast of those states that had already seceded: South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas. Eight days later, on 27 April 1865, Lincoln extended the blockade to include Virginia and North Carolina, even before North Carolina had officially seceded (Tucker 2006:79).

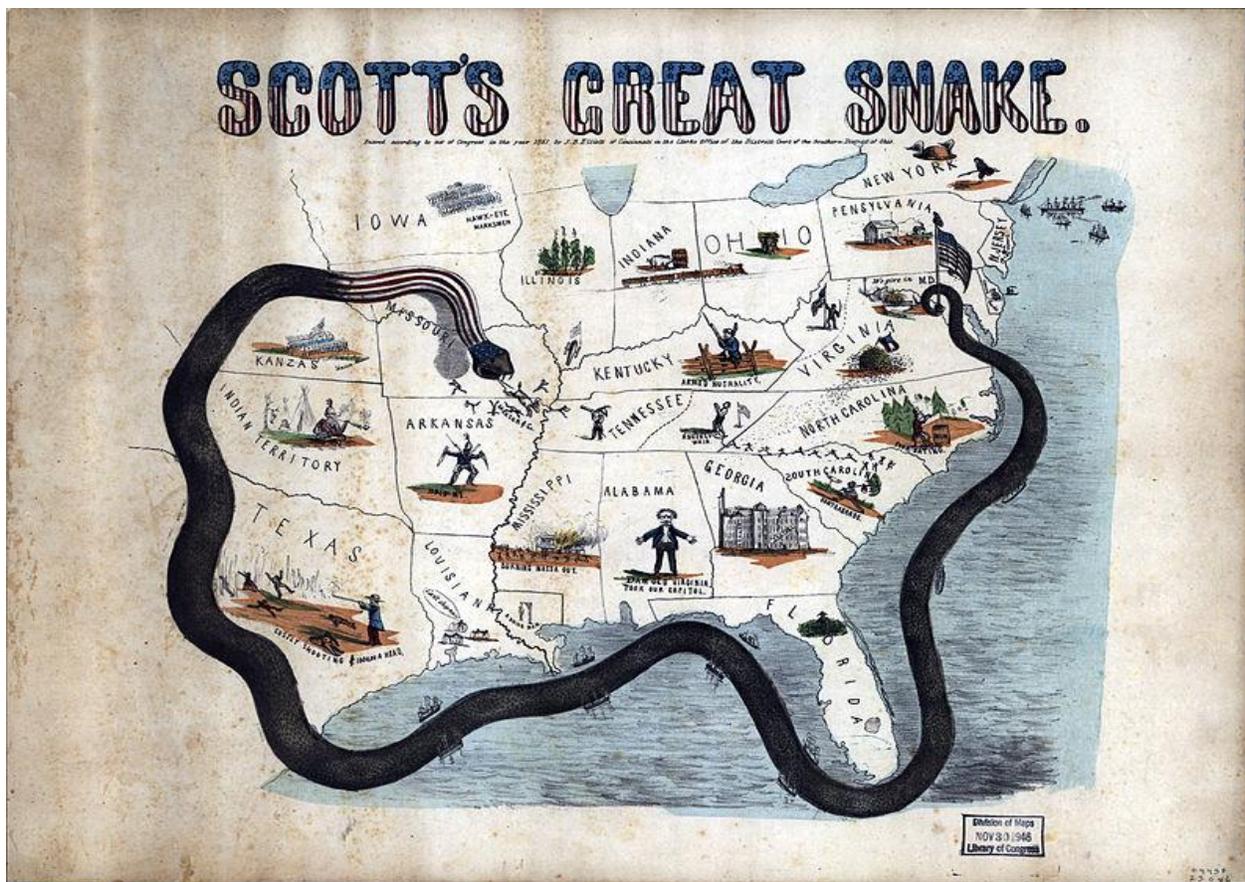


Figure 5: The Anaconda Plan developed by Winfield Scott (Library of Congress).

Although the Anaconda Plan looked good on paper, the Union Navy's ability to put it into effect was a different matter. The strategy called for an immense number of ships. First, the plan needed ships to transport tens of thousands of men south along the Mississippi River. Those

transports would also need gunboats for protection against Confederate gunboats or shore batteries. The blockade of the Confederate coast added an even greater obstacle. The southern coast was over 3,000 miles long. The number of ships needed to effect the Anaconda Plan would be in the hundreds. In March 1861, the Union Navy only had 90 vessels, and only 52 were serviceable, and those serviceable, only 42 were commissioned (Canney 1998:17,178; Tucker 2006:1).

Of those vessels, 24 were on foreign missions and would take months to return to the United States for reassignment. The six steam frigates that formed the backbone of Union naval strength, *Merrimac*, *Wabash*, *Minnesota*, *Roanoke*, and *Colorado*, were laid up in ordinary. *Merrimac* was lost to Confederate forces because it was docked in Norfolk when Virginia seceded. Even more of an issue was the size of the remaining steam frigates: they were too large for the shallow coastal waters of the South. In reality, the Union Navy, when President Lincoln enacted the blockade policy, had only a dozen ships, five of which were only sailing vessels, that could execute the blockade (Symonds 2008:49; McPherson 2012:25).

Despite the glaring inadequacy of the Union Navy's ability to execute the blockade, many in Lincoln's cabinet advised that the Union naval force as it was with only a few additional vessels would be enough. According to Merrill:

To blockade the South, Simon Cameron, the wizened, white-haired chief of the War Department, advised Lincoln that he needed only a few coasting vessels armed with pop guns. New York shipping bosses estimated that thirty ships should do the trick. The old fogies of the Navy, remembering the glorious days of 1812, visualized fleet collisions and men battling hand-to-hand on the open decks (Merrill 1957:9).

Lincoln's only advisor who took the blockade and Union Navy's predicament seriously at the beginning of the war was Secretary of the Navy Gideon Welles. Under his direction, against what others believed, an initiative for building new ships began. This shipbuilding initiative led to

constructing 23 new gunboats, 14 screw sloops, and 12 side-wheelers in 1861 alone (McPherson 2012:25-26). Nonetheless, it took time to build new vessels. While keels were being laid down, Welles began buying or chartering any vessel he could, including ferries and harbor tugs, in order to mobilize a naval force (Symonds 2008:56-57).

One of the best examples of the vessels chosen for purchase in the early mobilization of the Union Navy is that of USS *Ceres*. *Ceres* was a side-wheel steamer built by Benjamin C. Terry and launched in 1856. It had a single-beam engine that gave it a maximum speed of nine knots and an average of four. More importantly, fully loaded, it only needed six feet of water for draft, making it extremely valuable in the shallow Carolina coastal waters (Department of the Navy 1921a:54). Terry's vessels had acquired a reputation of being fast and reliable so he was contracted to build several for the Union Navy (Jeandron 2003:49-53). Beginning in 1859, *Ceres* was chartered for excursion cruises throughout the summer months before returning to harbor duties in the fall, winter and spring (*New York Herald* 1859:5; 1860:10; 1861:1). On 24 August 1861, the United States Navy purchased *Ceres* for \$12,100 (Department of the Navy 1921a:54). *Ceres* is an example of the vessel types needed to fight the naval war against the Confederacy; steamers with high speed and low draft, but sturdy enough to tow other vessels if need be. Such characteristics made steamers like *Ceres* the most desired for enforcing the blockade off the southern coast. By using shallow drafted ferries and harbor tugs available throughout northern ports, Welles and the Union Navy were able to mobilize a force capable of enforcing the blockade in such a way as to legitimize the effort.

That any man was able to assemble a navy under such circumstances is remarkable. Nonetheless, Secretary Welles was able to do so by purchasing or chartering practically any ship that could float. By the closing months of 1861, the fleet of converted harbor tugs and ferries

began blockade operations along the Confederate coast. Along with larger blockading vessels, the ragtag fleet was able to begin operations against strategic targets along the Confederate coastline (Tucker 2006:80).

### *The State of the Confederate Navy*

While the Union Navy was in a precarious position at the beginning of hostilities, it was still a much more favorable position than the Confederate Navy. Three elements of building a navy were against Confederate Secretary of Navy Stephen Mallory: money, sailors and ships. This, however, did not stop him from implementing a ship building initiative like his Union counterpart, Gideon Welles (Luraghi 1997:6; Canney 1998:18).

Money was the foremost issue in developing a Confederate Navy. Mallory had to submit his proposals to the Committee for Naval Affairs in the provisional Congress, and later, to both the Senate and House of Representatives after the Confederate government was established. If approved, he then had to take his proposal to the Secretary of Treasury Christopher Memminger. This led to delays and misunderstandings for finances between the Navy Department and Treasury. Instead of working hand-in-hand with the War Department, Mallory was reduced to navigating government red tape and begging for money from the Treasury instead of using his time to prepare a naval force (Luraghi 1997:6; Tucker 2006:11).

In terms of personnel, the South did not have a surplus of experienced sailors. This is inherently tied to the lack of merchant tonnage that was owned by southern merchants before the war. Before the war, merchants in the South owned a mere 500,000 tons out of the total tonnage of 5.5 million tons in the United States. The merchants in New York and New England owned 1.7 million tons and 1.8 million tons, respectively. In this regard, the Union had the upper hand in trained men from the extensive merchant marine employed by Northeastern merchants. At the

same time, the experienced southern sailors joined the ranks of the army before the Confederate Navy could claim them (Luraghi 1997:7-8; McPherson 2012:27).

Similarly, the southern states remained largely agrarian (Watson 1892:2). As such, the Confederacy lacked what Luraghi calls the “industrial reserve army” (Luraghi 1997:8). With significantly less industrialization than the northern states and a shortage of skilled laborers, the south lacked the labor needed to run shipyards, build and repair ships. In some instances, the government offered exclusion from the military service and the draft to laborers of any race if they had a skilled trade that could be used at the naval shipyards (Melton 1997a:95). Fortunately, the Confederacy had a large naval officer corps in comparison to their number of skilled sailors (Luraghi 1997:8; McPherson 2012:27).

The final element working against Mallory was the number of ships the Confederacy possessed. As stated above, Mallory enacted a shipbuilding initiative much like Welles did in the North; however, due to his financial constraints, this was not nearly as feasible as it was for Welles and the Union Navy. The Confederacy was fighting a defensive war. Keeping this in mind, Mallory first sought defense forces for southern ports and waterways (Canney 1998:18).

Mallory knew that the Union Navy was comprised entirely of wooden vessels. He sought to build several ironclads for the protection of southern ports, immediately putting the wooden vessels of the Union at a disadvantage (Canney 1998:18; Tucker 2006:10). He also favored purpose-built vessels to conduct war as opposed to converted merchant steamers. However, he understood the immediate need for protection, should war break out, and understood that purchasing and converting vessels was more expedient than constructing them (Holcombe 1997:43).

At the beginning of the war, the Confederacy faced the same issue that the Union did in

terms of a lack of ships. Their problems extended further to a lack of skilled sailors, a lack of industrial skilled labor, and financial pressures. Adding to the urgency, the Union blockade was quickly forming and beginning to strangle the Confederate economy.

#### *Geography of Port Repairs and Re-coaling*

One last issue of note at the beginning of the war concerning the naval war for both belligerents is that the Confederate coastline was over 3,000 miles long. When the southern states seceded, they captured the Gosport Navy Yard near Norfolk, Virginia, and the Warrington Navy Yard in Pensacola, Florida. This left the Union Navy with no resupply stations south of Washington, D.C. To operate the blockade effectively, the Union needed to gain control of deep-water ports in the South (Melton 1997b:70).

Despite having many rivers, inlets, and harbors where vessels might lay up for basic repairs and wait out bad weather, there were few good deep-water ports. Elizabeth City itself was only a shallow water river port, established for canal trade. The same was true for many other ports along southern rivers (Tucker 2006:80; Symonds 2008:62). Those small ports could accommodate a few vessels for re-coaling and victualing but never the immense number that the blockade would require. The ports required would also need sufficient railroad connections to the interior to make further excursions inland (Tucker 2006:81). Gideon Welles and his aides counted 10 such ports: Norfolk, Virginia; Beaufort, New Bern, and Wilmington in North Carolina; Charleston, South Carolina; Savannah, Georgia; Pensacola, Florida; Mobile, Alabama; New Orleans, Louisiana, and Galveston, Texas. Secondary ports of importance were Saint Augustine and Key West in Florida (Tucker 2006:81-82).

These ports were the first targets of the blockade. They were heavily defended by shore fortifications and would cause heavy casualties if immediately stormed. The southern states had

seized the vast majority of Federal fortifications and begun constructing additional earthwork fortifications. From the beginning of the war, the South had intended on fighting from the land to the sea; if their navy could not hold off Union amphibious operations, their forts would (Luraghi 1997:11). Even late in the war, December 1864 and January 1865, it took a fire ship, two land attacks, hand-to-hand fighting and over 1.6 million pounds of iron projectiles from a Union bombardment before Fort Fisher in Wilmington, North Carolina fell (Webster 2010:65-66).

The reliance on shore fortifications and ports formed the overarching Confederate defense strategy. In the Age of Sail, ships were at the mercy of wind and currents; they needed to anchor to bombard a fortification, making them vulnerable, stationary targets to a fort's guns. A single coastal fort gun was worth four guns aboard a ship (Dougherty 2010:42). This is one reason why, because of a lack of ships, the Confederacy opted for a "from the land to the sea" styled naval war, putting their faith in forts. Rifled artillery and steam power made this concept obsolete, giving ships freedom from the wind and current. Because naval war was slowly catching up to technological advances, and because the entire coastal defense system throughout the United States had been developed for sail tactics, this was the first time Americans would see the advantages of steam vessels and the vulnerability of shore batteries. As such, the Confederacy put more faith in their coastal guns over defensive fleets according to conventional wisdom (Luraghi 1997:11; Dougherty 2010:42).

The fortifications and port capacities of both belligerents are important to know for any discussion on the state of either navy in the beginning of the war. The Union needed to capture strategic locations on the coast, not only to push further into Confederate territory, but to effectively continue the blockade further south than it could with only naval yards in Washington, D.C. Meanwhile, reliance on shore fortifications formed the backbone of

Confederate naval strategy.

#### A Brief Account of the Battle of Hatteras Inlet

The Battle of Hatteras Inlet is not directly related to the Battle of Elizabeth City. Instead, it is the seed that eventually led to the Burnside Expedition. Following the Union victory, questions arose as to what to do with the inlet. The inlet allowed the blockading fleet protection from storms that often hit the Cape Hatteras region (Dougherty 2010:43). Despite this, some in the navy wanted to close the inlet. McClellan himself stated that he agreed with others who wished to keep the inlet open for further use (McClellan 1861:627-628). Ultimately, any discussion of the Battle of Elizabeth City must contain an examination of the Battle of Hatteras Inlet as they belong to an overarching campaign objective of taking control of eastern North Carolina.

As an offensive measure of the naval war, President Jefferson Davis began granting letters of marque and reprisal to begin recruiting privateers for Confederate service. Only 50 or so individuals obtained letters of marque but they soon caused a great worry among Union merchants (Tucker 2006:82; Symonds 2008:40-42; McPherson 2012:32-33). The privateers caused so much worry that it was two days after Jefferson Davis announced his intent to begin issues letters of marque and reprisal that Lincoln responded by issuing the blockade (Symonds 2008:41-42). The majority of prizes were taken in the first two years of the war before the tightening blockade made sailing to prize courts unsustainable, leading civilians to take up blockade running (Holcombe 1997:48).

At the same time, some state navies used some vessels as privateers before officially joining the Confederacy. An illustrative case particular to North Carolina waters is CSS *Winslow*, a vessel that belonged to the short-lived North Carolina Navy. In early May 1861, Governor Ellis

approved measures for purchasing *J. E. Coffee* in Norfolk. The vessel was renamed *Winslow* and commissioned by the North Carolina Navy. Scharf states that *Winslow* began operating as a privateer and immediately began taking prizes off Hatters Inlet:

...Among them the brig *Hannah Butley* with molasses; the bark *Linwood*, with 6,000 bags of coffee; the schooner *Lydia French*; the brig *Gilvery*, with 315 tierces [casks] of molasses; three unknown brigs; the schooner *Gordon*, with fruit; the schooner *Priscilla*, with 600 bushels of salt; a brig and three schooners; the brig *Itasca*, with 500 hogsheads of molasses; and the schooner *Henry Nut*, with mahogany and logwood (Scharf 1887:369).

*Winslow* also made a prize of the schooner *Transit*. It was taken off Hatteras Inlet as well on 30 June 1861. *Transit* was sailing in ballast having delivered provisions to Key West and was on its way to New York when captured. The vessel was worth \$12,000 (*Daily Columbus Enquirer* 1861:2). On 3 July 1861, *Winslow* took the schooner *Herbert Manton* as a prize, with a cargo of sugar and molasses (Backus 1861:67). After *Winslow* was turned over to the Confederate Navy and re-commissioned, it became a munitions transport vessel under the same name, occasionally returning to commerce raiding along with CSS *Beaufort* and the privateer *Gordon* before its sinking (Rowan 1861a:270-271).

Soon the coast of North Carolina became the main hotbed for privateers and small blockade runners. The shallow bars kept the heavier blockading ships from pursuing the lighter privateers, who would dart in and out of Pamlico Sound. After the construction of two forts, the Confederates boasted the inlet was impervious to capture. As the privateers' presence increased, Secretary Welles and Admiral Silas Stringham organized an offensive to take the inlet (McPherson 2012:33).

At Hatteras, the Confederates had taken down the lanterns from the lighthouse and sunk all channel markers to confuse pilots and force them upon the shallow bars of the inlet. From the lighthouse, a lookout would give a signal that the coast was clear of Federal vessels and the

privateers *Winslow*, *York*, or *Gordon*, would dash out from the inlet and take the prize (Barrett 1995:36). The captains of *B. T. Martin* and *Linwood* were both taken prisoner. The Confederates treated both fairly; however, while waiting for their release, both would collect all information they could and pass it along to Union officials (Barrett 1995:37).

The information these two men collected was invaluable to Welles. The Confederates realized how strategic Hatteras Inlet was and began constructing earthworks, Forts Hatteras and Clark, to protect the passage. Hatteras was the larger fort, constructed on higher ground allowing it to watch over the harbor and protect the smaller Fort Clark. Fort Clark faced the sea to deter invasion forces. Both were armed with ordnance retrieved from the Gosport Navy Yard near Norfolk (Barrett 1995:37).

The privateers were not the only problems according to the two captured captains. The captain of *B. T. Martin* reported ships leaving the inlet for Europe, Halifax, and the Caribbean, mostly under British flag. The captain of *Linwood* observed much the same thing; he supposed some fifty vessels of 100 to 150 tons burden sailed out of the inlet during his imprisonment (Barrett 1995:37). Marine insurance companies were making life hell for Welles as they clamored for action against the privateers, while the blockade runners operating out of Hatteras were making a mockery of his blockade. He needed to take the inlet even more because storms off Cape Hatteras were often too strong to keep the blockading squadron on station and Pamlico Sound on the other side of the inlet offered refuge from the storms. Both of the captured captains stated their beliefs that the inlet could be taken without a great loss of life due the forts' hasty construction (Dougherty 2012:40-41).

On the morning of 28 August 1861, the steamers *Wabash*, *Minnesota*, *Cumberland*, and *Susquehanna* began bombarding the forts (Figure 6). Stringham's tactic of keeping the ships in

constant motion, firing as they ran past the fort and coming back on a different course, kept the Confederate gunners from being able to train their guns effectively. This tactic was overcompensation. As feared the night before, the fort's guns did not have the range to compete with rifled cannon aboard the fleet (Dougherty 2010:42). This is important to note because the fundamentals of this tactic were later applied at the Battle of Port Royal (7 November 1861) and the Battle of Roanoke Island (7-8 February 1862) (see McPherson 2012:40, 53). While the officers in command of those fleets modified the tactical approach as per their battle situations, at Elizabeth City, Lynch expected Rowan to focus on the fort first.

Around midday, Fort Clark was abandoned. The soldiers ran for Fort Hatteras to defend it while others retreated to rowboats and started for Pamlico Sound. The Union troops who had landed in the early morning now took control of Fort Clark. No flag flew above Fort Hatteras and the Federals believed it had surrendered as well (Tucker 2006:83).

The next day, the Confederates raised the flag taken from Fort Clark. Commodore Samuel Barron had come to take over command at Fort Hatteras during the night with other reinforcements brought by *Winslow*. The Confederates were running low on ammunition and fired only a few times during the first hour to bring the Federal fleet closer before countering. These shots fell short of the Federal flotilla (Tucker 2006:84). After a Union shell started a fire near the magazine that could not be put out without subjecting troops to enemy fire, Barron lowered the Confederate flag in surrender at 11:10 A.M. Barron was rowed to Stringham's vessel where he surrendered his 670 troops, the forts and their guns, and the inlet (Tucker 2006:84; McPherson 2012:34).



Figure 6: The Battle of Hatteras Inlet (Currier and Ives Publishers 1861).

With the capture of Hatteras Inlet, the Union took control of the major and most strategic passage from North Carolina's sounds to the ocean. Stringham convinced Welles that the channel should be kept open for future operations instead of being blocked with sunken schooners as the plan was originally conceived (Dougherty 2010:43). Hatteras became the first strategic asset to the 1862 Burnside Expedition and the Federal occupation of eastern North Carolina (McPherson 2012:34).

There is a greater importance to the Union victory at Hatteras Inlet. The First Battle of Bull Run (Manassas), the first major battle of the war, had occurred only a month prior to the engagement at Hatteras. The battle's result was a decisive Confederate victory. After it, morale in the Union faltered. The victory at Hatteras gave the Union a much needed victory and morale boost (Barrett 1995:45; Tucker 2006:84; McPherson 2012:34). It was the first major Union victory of the war. It put an end to the privateers who terrorized trade along North Carolina's

coast. It put an end to the blockade runners running out of Hatteras (although blockade running would continue in other ports until the end of the war). It gave the Union a strategic point from which to launch future operations. Despite this victory, this was only the beginning of taking control of eastern North Carolina. While Confederate regiments retreated to Roanoke Island, the largest naval threat to the Union advance was now the Confederate Mosquito Fleet.

### The Mosquito Fleet

In the early months of the war, the Confederate Navy absorbed the state navies formed before states officially joined the Confederacy. South Carolina turned over a fleet of an old sailing revenue cutter, a harbor tug, a few converted fishing vessels, and three small steamers. Mississippi offered no navy, instead choosing to strengthen its shore fortifications. Florida supplied one sailing schooner and Alabama a revenue cutter and a tug. Louisiana gave two more revenue cutters to the Confederate Navy and Virginia provided two passenger steamers and a tug (Luraghi 1997:11). North Carolina was no different in that it had formed a small fleet for protecting its sounds, inlets, and harbors.

Beginning in May 1861, Governor Ellis began forming a navy for coastal defense. On 9 May 1861, he received a letter regarding suitable ships from agent Marshall Parks (Tolbert 1964[2]:733). This was 24 days after Ellis refused to raise troops for the Federal army, 12 days after President Lincoln extended the blockade to include Virginia and North Carolina, and 11 days before North Carolina officially seceded from the Union. Before his state was even out of the Union, Ellis was preparing for war.

In the letter sent to Governor Ellis on 9 May 1861, Parks listed 18 steamers that would be suitable for service as gunboats or army transports: *Curlew*, *Sea Bird*, *Stag*, *John Stiles*, *Alice*, *Currituck*, *Loper*, *Caledonia*, *Kahukee*, *Fairfied*, *J. N. Smith*, *Pennsylvania*, *Junalaska*, *Wasp*,

*Roanoke*, *J. B. White*, *Calypso*, and *News Boy*. Of these, six were purchased and another chartered. The six purchased were: *Curlew*, *Sea Bird*, *Loper*, *Caledonia*, *Fairfield*, and *J. N. Smith* while *Kahukee* was chartered after the price to purchase it was deemed too high (Tolbert 1964[2]:733-734; Long 2013).

These vessels, along with *Winslow* mentioned above, formed the North Carolina State Navy. These vessels did not do much during their time in the short-lived state navy. Only *Winslow* and *Caledonia*, by then renamed NCN *Beaufort*, engaged in privateering. The other vessels were used as transports or supply ships (Tolbert 1964[2]:826; Long 2013).

North Carolina transferred the majority of the steamers to the Confederate Navy in July 1861. The state retained use of *Winslow* and *Beaufort* as privateers until 20 August 1861 when all North Carolina forces came under Confederate command. After being commissioned as Confederate Navy vessels, some were renamed. The new fleet was as follows, with their original names in parentheses if renamed: CSS *Curlew*, CSS *Sea Bird*, CSS *Raleigh* (*Loper*), CSS *Beaufort* (*Caledonia*), CSS *Ellis* (*Fairfield*), CSS *Forrest* (*J. N. Smith*), and CSS *Winslow* (Long 2013). These vessels would form the backbone of the Commodore William Lynch's Mosquito Fleet when he faced Commander Rowan at Elizabeth City.

The Mosquito Fleet presented several problems for the Union fleets. Much like a swarm of mosquitoes, it picked relentlessly at the Union's North Atlantic Blockading Squadron. So long as it survived, it continued to pose a threat to Union operations. First, it engaged in feinting maneuvers to bring Union blockade ships within range of shore fortification guns. On 28 December 1861, *Sea Bird* had anchored off Craney Island near Norfolk because the water in the Albemarle and Chesapeake Canal was too low. The next day, shortly after daybreak, the unarmed USS *Express* was sighted with a water schooner in tow. *Sea Bird* gave chase to capture the

unescorted pair, firing on the *Express*, whose crew immediately cut the schooner adrift to escape as a shell from *Sea Bird* exploded and set *Express* on fire. The Union vessels had mistaken *Sea Bird's* signal flag in the low morning light. As soon as *Sea Bird* took the schooner in tow, eight Federal steamers were dispatched to capture both vessels. *Sea Bird* made for the fortifications protecting Norfolk from Craney Island and Sewell's Point as the eight steamers fired upon it, soon joined by Federal steamers from Hampton Roads. The fort batteries opened fire on the Federal steamers as *Sea Bird* towed the prize to the harbor. For the next half hour, the steamers and batteries exchanged shots until the Federal steamers were given orders to return to the blockade (Goldsborough 1861:491; Hays 1861:492; Lynch 1861a:492-493).

While *Sea Bird's* intention was not to draw the Union steamers within firing range of the shore batteries by taking the prize schooner, it did just that. No Union vessel was destroyed by the exchange with the forts, but the engagement could have ended much worse. The shore batteries could have easily disabled one of the steamers, sinking or taking one out of action and in need of repair. Lynch would later attempt this tactic at the Battle of Roanoke Island in an attempt to isolate Union steamers or draw them into channel obstructions.

Another threat posed by the Mosquito Fleet was the potential for hit and run raids on individual vessels flying the Union flag. This was the intention of *Sea Bird* in the story above. Another example is the loss of USS *Fanny* (Figure 7). *Fanny* had been an US Army steam tug, used for transporting men and munitions. On 1 October 1861, Acting Master Morrison brought *Fanny* through Loggerhead Inlet to bring supplies of clothing, ammunition, and provisions to Federal forces at Chicamicomico. A navy steamer, USS *General Putnam*, was supposed to keep watch and protect *Fanny*, but instead left its position. After anchoring in eight feet of water at 1 P.M., Morrison waited two hours for a flatboat to take the supplies ashore. About 4 P.M., CSS

*Curlew* appeared and cut off their escape route. Shortly reinforced by CSS *Raleigh* and another steamer, *Curlew* began closing in and firing on *Fanny*. Captain Hart of the 20th Indiana Regiment was aboard with some of his soldiers. He immediately proposed surrendering the vessel. The mate and some soldiers threw overboard 30 cases of ammunition and would have tossed the cannon as well had Captain Hart let them. In the end, the crew slipped the anchor and ran *Fanny* aground to be taken while the crew of *Fanny* got away in a ship's boat. When asked why he had abandoned *Fanny*, Captain Hotchkiss of *General Putnam* claimed that he needed coal despite having the ability to procure some from *Fanny* (Rowan 1861b:275; Morrison 1861:276).

Under the right circumstances, the Mosquito Fleet could easily pick off unarmed or individual Union vessels. *Fanny* would end up being commissioned as a Confederate vessel and part of the fleet at Elizabeth City. Even though the Union had the greater capacity of obtaining new vessels, each loss was critical in the first year of the war, when the blockade fleet was still forming.

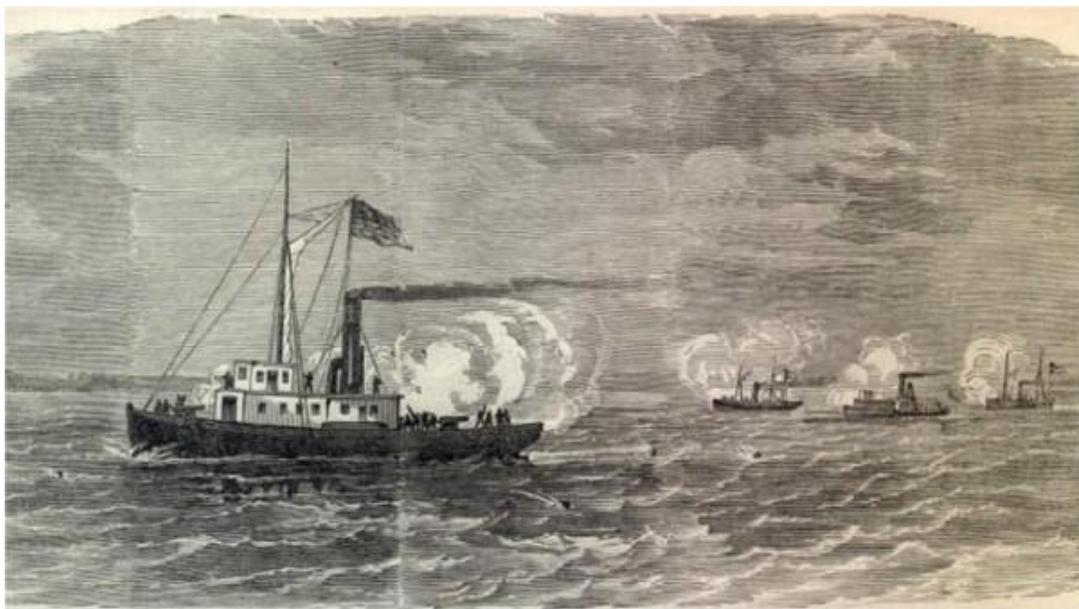


Figure 7: Capture of USS *Fanny* (Frank Leslie's Illustrated Newspaper 1861).

The last threat that the Mosquito Fleet posed was never realized, although there was a potential risk, especially at the beginning of the war. Blockade runners could have chosen the shortest route from the neutral port where supplies were loaded onto the vessels. From the Bahamas, the closest ports were in Florida, Georgia, and South Carolina. From Cuba, any port on the Gulf Coast was only a few days' sail. From Bermuda, the closest ports were those in North Carolina. The first port of preference for any blockade runners from the Bahamas or Bermuda seems to have been Charleston. At the beginning of 1863, that switched to Wilmington (Webster 2010:318-320). Before the blockade became effective, the Mosquito Fleet could have escorted blockade runners through gaps in the blockade. Certainly, they may have offered a degree of protection for the blockade runners risking the gauntlet into Wilmington later in the war. By that time, the Mosquito Fleet had been destroyed for nearly a year; however, the fact remains that while it operated, the potential was there for it to have distracted Union vessels or otherwise escorted blockade runners to port.

Even though the Union fleet of converted gunboats outnumbered the Mosquito Fleet, the dangers it posed were not minimal. It captured one Union Army tug and a schooner. It had drawn Union vessels into the field of fire from Confederate shore batteries. It may have taken a steamer had the schooner not been cut adrift. The Mosquito Fleet was a distraction to the blockading vessels and a dangerous one at that. That is why, at the Battle of Elizabeth City, Flag Officer Goldsborough ordered Commander Rowan to advance and destroy the Confederate fleet before it had the chance to regroup (Goldsborough 1862:604-605).

#### The Burnside Expedition and the Battle of Roanoke Island

The Burnside Expedition to North Carolina began as an initiative to launch amphibious assaults against strategic points in Chesapeake Bay and along the banks of the Potomac River.

Brigadier General Ambrose Burnside was ordered to raise two brigades of troops from New England states as many of the raised troops would already be familiar with sailing and operating out of shallow draft vessels, making them ideal soldiers for amphibious operations (McClellan 1864:83-85; Burnside 1887:660-661).

While Burnside was assembling the expeditionary force, George McClellan was promoted to General-in-Chief. In designing a new strategy for Union forces, McClellan agreed with advisors that further operations should be concentrated on North Carolina now that Hatteras Inlet was under Federal control (McClellan 1861:627-628). McClellan authorized expeditions to North Carolina as well as to South Carolina, Georgia, Florida, and Louisiana. The new strategy called for joint army-navy operations to cut Confederate communications systems to and from Richmond and distract Confederate forces from Virginia (McClellan 1864:83-86).

The new strategy sent Flag Officer Louis Goldsborough to assemble a fleet to work alongside Burnside's forces. On 7 January 1862, both Burnside's Coastal Division and troop transports assembled along with Goldsborough's fleet. McClellan issued orders for them, first to capture Roanoke Island and from there, Albemarle Sound. After that objective, the next was to capture New Bern and the railroad running from that port. From there, the forces would capture Beaufort and follow the railways west to Goldsboro if possible. If not, McClellan stated that the destruction of the Wilmington and Weldon Railroad would be a great victory (McClellan 1864:85-86). The Wilmington and Weldon Railroad was of singular importance because all trains with trade east of the Appalachian Mountains passed through Weldon, North Carolina. It was also the route over which supplies and troops got to Virginia. From Weldon, the railroad ran south to Goldsboro, where it met up with the Atlantic and North Carolina Railroad, which connected Goldsboro to New Bern. (Dougherty 2010:81). With the orders given, the objectives

of the Burnside Expedition were made: Roanoke Island and Albemarle Sound, New Bern, Beaufort, and west along the railroads to destroy them.

Roanoke Island was of particular strategic value. Just as Hatteras Inlet was the major passage through the Outer Banks for large ocean going vessels, Roanoke Island guarded the channel that led from Albemarle Sound to Pamlico Sound. Croatan Sound, with Roanoke Island to the east and the North Carolina mainland to the west, had the only channels deep enough for travel. Roanoke Sound, between Roanoke Island and the Outer Banks, was too shallow. The Union already had control of Pamlico Sound from the victory at Hatteras Inlet (Tucker 2006:95). If Union forces took control of Roanoke Island, they would then control access to Albemarle Sound, excepting the two canals connecting northeastern North Carolina to Norfolk. Control of the island would in essence give the Union control of the coast from Cape Lookout to the Virginia border (McPherson 2012:51). The threat was a dangerous one for the Confederates; Union control of Albemarle Sound would give the Federal forces the ability to attack Gosport Navy Yard from the rear.

Roanoke Island was protected by several forts. At the beginning of the war, Confederate engineers supposed that any Federal attack would come from Albemarle Sound and the north. As such, all the forts, Huger, Blanchard, and Bartow, were sited on the island's north end, pointing west towards Croatan Sound and the mainland. Below them was an eight mile long shoreline free of any batteries. Across Croatan Sound from Fort Huger was a floating battery, named Fort Forrest. In the middle of the island, a small fortification had been constructed, consisting of three guns and flanked by quicksand marshes. At the same time, several schooners had been sunk in the channel along with pilings to trap the Union fleet and reduce their maneuverability, thus making them easy targets for a crossfire between Forts Forrest, Blanchard, and Huger (Tucker

2006:96). Finally, Flag Officer Lynch had the Mosquito Fleet, which by the time was made up of the following vessels: *Curlew*, *Sea Bird*, *Raleigh*, *Ellis*, *Fanny* (formerly USS *Fanny*), *Forrest*, *Beaufort*, and *Black Warrior*. *Black Warrior* was a schooner that Lynch pressed into service a few days earlier and did not provide much support for the small Confederate fleet as it was anchored beyond the line of battle. *CSS Appomattox* would join the fleet at the end of the battle, having been called south from Virginia (Dougherty 2010:75-76).

Burnside and Goldsborough interrogated a runaway slave from the island and learned that the fort's guns were no match for the Union fleet. Furthermore, they believed there to be fortifications on the southern end of the island and expected the heaviest resistance there. They had planned to dash through the channel with the fleet's naval ships first to bombard the forts at the northern end of the island, concentrating particularly on Fort Bartow. While the bombardment was under way, Burnside and the army transports would land troops at Ashby's Harbor, located several miles below the forts (Figure 8) (Merrill 1957:90; Dougherty 2010:75-76).

At 11:30 A.M. on 7 February 1862, the naval division of the fleet, under the command of Commander Stephen Rowan, opened fire on the forts. The vessels kept in constant motion like the fleet at Hatteras Inlet had done, hugging the shoreline, magnifying the problem of training fort guns on the ships. After observing weaknesses in the Confederate defense, Rowan soon gave the order for the fleet to anchor outside the range of the fort guns and continue the bombardment. They would continue maneuvering at times, but only minimally (Tucker 2002:28). The guns at Forts Huger and Blanchard did not have the range to challenge the Federal fleet. The only help Fort Bartow had would come from Fort Forrest and the Mosquito Fleet (Dougherty 2010:76).

The Mosquito Fleet remained behind the pilings and sunken schooners, trying to provoke

the Union fleet to advance and attack, which meant falling prey to the channel obstructions. Several times Lynch ordered a retreat to Fort Huger before returning to the barricade of obstructions in an attempt to feign and draw out Union steamers from formation. The vessels under Rowan's command continued bombarding the forts and exchanging fire with the Mosquito Fleet, but not advancing on the Confederate fleet's line of battle (Still, Jr. 1997:215). CSS *Forrest* was struck and had to withdraw from battle because of damage to its propeller. CSS *Curlew* was damaged and began taking on water (Tucker 2006:97). The captain intentionally grounded the vessel to keep it from sinking completely. He grounded the vessel, unfortunately, right in the line of fire of the guns from Fort Forrest, thus effectively ending the battery's participation in the battle (Dougherty 2010:76-77). Due to expending all his ammunition and having taken considerable damage to his fleet, Lynch retreated Elizabeth City to regroup. After another day of shelling, the island surrendered in the late afternoon.



Figure 8: The Battle of Roanoke Island (Currier and Ives Publishers 1862).

The Union captured nearly the entire 2,500 strong Confederate garrison on Roanoke Island. In addition, Burnside and Goldsborough had secured the largest land victory east of the Allegheny Mountains to that date. They were also able to prove the effectiveness of a joint amphibious operation, using both army and navy personnel and resources. With the success at Roanoke Island, the joint operation model added a new dimension to threats posed by the Union to the Confederate coast. However, most important, the Union now held control over all waterborne choke points in eastern North Carolina. They controlled access from Albemarle Sound south and from Pamlico Sound to the Atlantic. They were then able to spread out and continue operations to take the Burnside Expedition objectives. Additionally, following continued Union victories throughout eastern North Carolina, Norfolk would fall to Union forces in May 1862 (Tucker 2006:100-102).

#### Conclusion

The timeline leading up to the Battle of Elizabeth City was born of the overall Union war strategy. By taking control of Hatteras Inlet, it eliminated the base for many privateers. It also gave the Union a foothold to advance into eastern North Carolina with the Burnside expedition, beginning with an assault on Roanoke Island. Following the federal victory at Roanoke Island, the decision to attack Lynch's Mosquito fleet was made. By doing so, Union forces directed their assault on Elizabeth City to exterminate Lynch's fleet as well as pacify the Albemarle region. The result was a resounding Union victory and occupation of Elizabeth City (Figure 9). Using the river port as a base for further operations, the Union continued to make further pushes into the northeastern North Carolina.



Figure 9: Elizabeth City and Albemarle Sound Under Union Occupation (Harper's Weekly 1862).

## Chapter 4 Methodology for Examining the Naval Action at Elizabeth City

### Introduction

This thesis' methodology had five stages for answering the research questions: historical research, Geographic Information Systems (GIS) modeling, magnetometry modeling, archaeological remote sensing survey with both side scan sonar and magnetometry, and analysis. A historical narrative formed from primary sources was used to create the GIS model that was later utilized to compile where the search for any material culture remaining from the battle should be focused. Magnetometry modeling using *pBlock* software (Geophysical Software Solutions Pyt. Ltd.) then allowed estimating the potential of discovering any material culture in the form of expended artillery ammunition. The archaeological data and GIS models were then combined to analyze the battle. The analysis was conducted by looking at the data from the theoretical positions of KOCOA/METT-T and using MNTT as outlined in Chapter Two and will be examined further in Chapter Six.

### Historical Research

Studying the historical narrative surrounding the Battle of Elizabeth City presents certain obstacles. Due to the brevity of the engagement and its temporal proximity to the more strategic Federal victory at the Battle of Roanoke Island (7-8 February 1862), secondary sources do not discuss the battle in detail. Most merely state that after Roanoke Island fell, Commander Stephen Rowan pursued the Confederates to Elizabeth City where the Southern fleet was destroyed (Merrill 1957:95-96; Dougherty 2010:80).

As such, secondary historical sources provide the historical narrative's overview of the Civil War's naval aspects and overarching campaign histories. These include Barrett's (1995) *The Civil War in North Carolina*, several different chapters from Still's (1997) *The Confederate*

*Navy: The Ships, Men, and Organization, 1861-1865*, Canney's (1998) *Lincoln's Navy: The Ships, Men and Organization 1861-65*, Tucker's (2002 and 2006) works *A Short History of the Civil War at Sea* and *Blue and Gray Navies: The Civil War Afloat*, Symonds' (2008) *Lincoln and His Admirals: Abraham Lincoln, the US Navy, and the Civil War*, Dougherty's (2010) *Strangling the Confederacy: Coastal Operations of the American Civil War*, and finally, McPherson's *War on the Waters: The Union and Confederate Navies 1861-1865*. Additionally, Merrill's (1957) *The Rebel Shore*, Trotter's (1989) *Ironclads and Columbiads: The Civil War in North Carolina*, and Coombe's (2002) *Gunsmoke over the Atlantic: the First Naval Action of the Civil War* were consulted. These sources, while only discussing the battle briefly, offer a look at the greater historical significance of the battle and how it fits into a larger historical context.

For the battle itself, primary sources from several different sources were examined from Joyner Library at East Carolina University and its internet databases. The most important source for studying the Civil War naval activity is the *Official Records of the War of Rebellion* and the *Official Records of the Union and Confederate Navies* (1861, 1862, 1921). This collection provides official documents including statements made by officers involved in any engagement where records existed at the time the volumes were compiled. Many former soldiers and sailors also published their wartime service as memoirs or unit histories following the war. Chief among these is John Scharf's (1887) *History of the Confederate States Navy from its Organization to the Surrender of its Last Vessel*. Published after the war, it could be considered a secondary source, except that Scharf served as an officer in the Confederate Navy and thus presents firsthand accounts of the war. Another important primary source includes William Parker's (1883) *Recollections of a Naval Officer*. Parker, one of the Confederate officers present at Elizabeth City, provides an eyewitness account complimenting Flag Officer Lynch and Lieutenant Cooke's

statements recorded in the *Official Records*. Other primary sources from enlisted sailors and soldiers discussing the battle in detail include Traver (1880), Blanding (1886), and Allen (1887).

Despite the amount of information regarding what is a relatively short battle, few works condense it to a concise battle narrative. Because the battle occurred during the backdrop of the Battle of Roanoke Island, it is often viewed as little more than a skirmish in the larger narrative of the Burnside Expedition. One Elizabeth City resident, Mr. Bruce Long, has attempted to form a battle narrative and has made images to assist with his time line of the battle (Figures 10 and 11).

Regarding material evidence from the battle, information concerning any historical wrecks that might be associated with the battle came from the North Carolina Underwater Archaeology Branch (UAB). During the 2001 field season, UAB mapped the wreck of CSS *Black Warrior*, which acted as a floating battery during the battle (Lawrence and Henry 2002) (Figure 12). An additional wreck associated with the battle, CSS *Appomattox*, was also recorded, however, this wreck was mapped out by divers under permit from UAB and there is no official site report (Figure 13).



Figure 10: The Confederate Battle Formation Above Cobb's Point (Courtesy of Bruce Long).



Figure 11: Naval Engagement of Elizabeth City (Courtesy of Bruce Long).

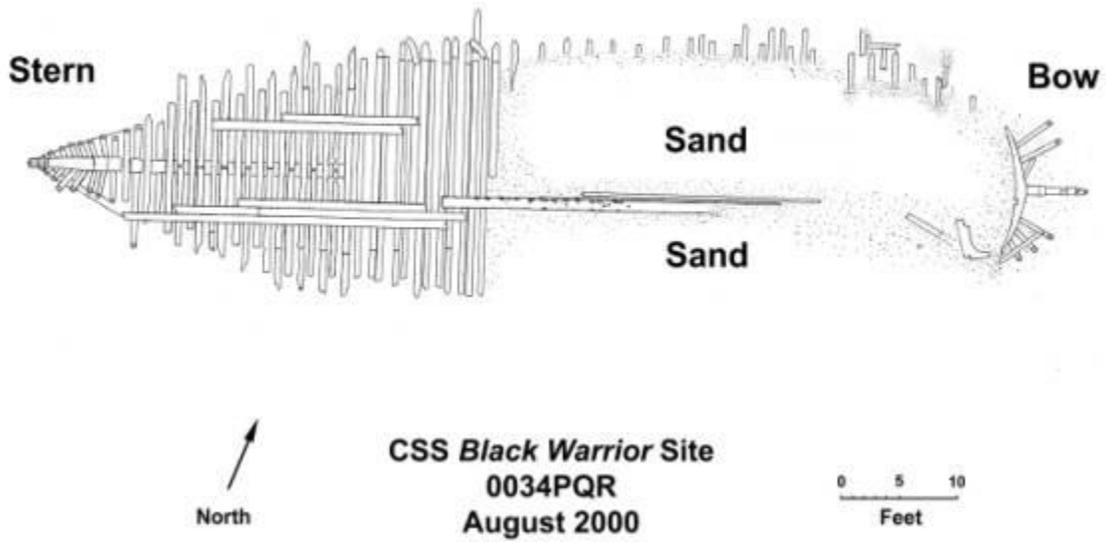


Figure 12: Site Plan of CSS *Black Warrior* (Lawrence and Henry 2002).

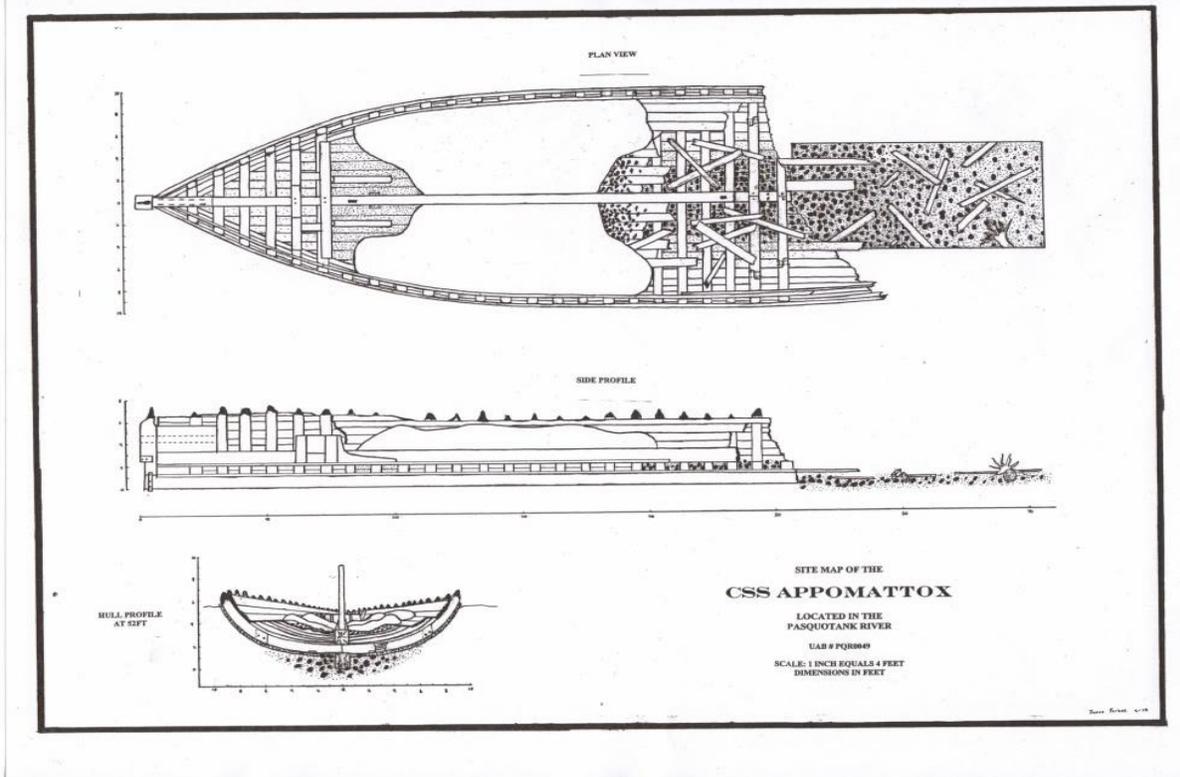


Figure 13: Site Plan of CSS *Appomattox* (Courtesy of Jason Madre)

Further historical information on the capabilities of artillery and small arms was needed. The fired projectiles from the guns could remain at the river bottom, and therefore, each gun's range was needed to determine the possible positions of the expended ammunition. For these data, Dahlgren (1856), Barrett (1863), Gibbon (1863), Holley (1865), Canfield (1969), Ripley (1970), and Stanage (2000) were used. These texts gave vital statistics such as maximum and effective artillery ranges whereas Stanage's report described the effective ranges of buck and ball shot. For vessel statistics of those involved in the battle, both the *Official Records of the Union and Confederate Navies* and the online database compiled by the Naval History and Heritage Command were consulted. Data from these sources allowed each ship to be constructed to scale in the GIS model and noted each ship's armament. These historical sources are discussed further throughout this study. Using the primary sources from the battle, a detailed narrative of the Battle of Elizabeth City is given in Chapter 5 and data on artillery ranges and vessel statistics are

discussed in the analysis of the battlefield in Chapter 6.

## GIS Model

The historical data was then input to ArcMap 10.1 software developed by ESRI and licensed by East Carolina University to generate a GIS battle space model. Following methodology developed in Simonds' (2014) study of the Battle of Roanoke Island, the steps included creating the GIS model by digitizing the historic landscape, creating both historic and modern bathymetric models, generating each vessel and Fort Cobb to scale in battle formations, placing naval artillery on each ship and creating fields of fire for each piece of artillery. These steps will be discussed further later in this chapter.

The present study sought to expand upon Simonds' methodology. The goal was to establish each ship in not only the battle space, but also temporally over four main stages. The first stage of the battle occurred when the Confederates began firing on the Union fleet, then two miles off Cobb's Point. The next stage came as the Union fleet reached a point within three-quarters of a mile from the Confederate position, when the orders to fire at will were given. The next stage put the Union rearguard within firing distance from the fort when the Union flotilla's vanguard began rushing the Confederate line. The final stage represented the boarding of two Confederate vessels and the pursuit of other Confederate steamers attempting their escape.

Before explaining the methodology further, a note must be made about the limitations of the GIS model. Simonds explains it best when he states:

First and foremost, the purpose of compiling data into a GIS was to produce an approximate digital model of the landscape of the battlefield [in its historical context]. This digital model serves primarily as a means of exploring the relationship between the elements of that landscape and the combatants to better understand the influence of those relationships on human behavior during the battle. The model is based on historic charts and descriptions from primary accounts, and is not intended to present a perfectly accurate representation of the details of the historic landscape

(Simonds 2014:28).

Imperfections between the modern landscape and the historic landscape are to be expected, however, this does mean the model is without merit. It is not the end-all-be-all in terms of evidence. The model is an interpretive tool with every decision in its creation being based in historical or archaeological data.

### *Digitizing the Historic Landscape*

With the limitations of using GIS models made explicit, the methodology in its creation can now be explained. A base map from the National Oceanographic and Atmospheric Administration (NOAA) (NOAA 2013) was downloaded. This base map, map number 12206\_8, represented the modern landscape around Elizabeth City and the Pasquotank River from its junction with Albemarle Sound to the Dismal Swamp Canal entrance and contains modern sounding data. Two additional maps were downloaded from NOAA's historic map collection, both from the United States Coast and Geodetic Survey (USCGS): *Coast Chart No. 41* (USCGS 1860) and *Coast Chart D No. 2* (USCGS 1855) (Figures 14 and 15). Both maps were downloaded as images that required cropping to show pertinent data prior to importing them as data to be georeferenced in the GIS model.

*Coast Chart No. 41* was georeferenced to the base map first because it was published in 1860, two years prior to the battle. *Coast Chart D No. 2* on the other hand was published in 1855, seven years before the battle took place. Since it was closest in time to the battle, *Coast Chart No. 41* was used to establish the historic landscape. Because *Coast Chart No. 41* was imported as a raster image with no geospatial data embedded in it, georeferencing intentionally distorted the image to fit the modern landscape as close as possible. Seven points were used to georeference *Coast Chart No. 41* to the base map: Cobb's Point, Hospital Point, Anson's Point,

the northwest tip of Machel Island, Brickhouse Point, and both the north and south points of the mouth to Mill Dam Creek.

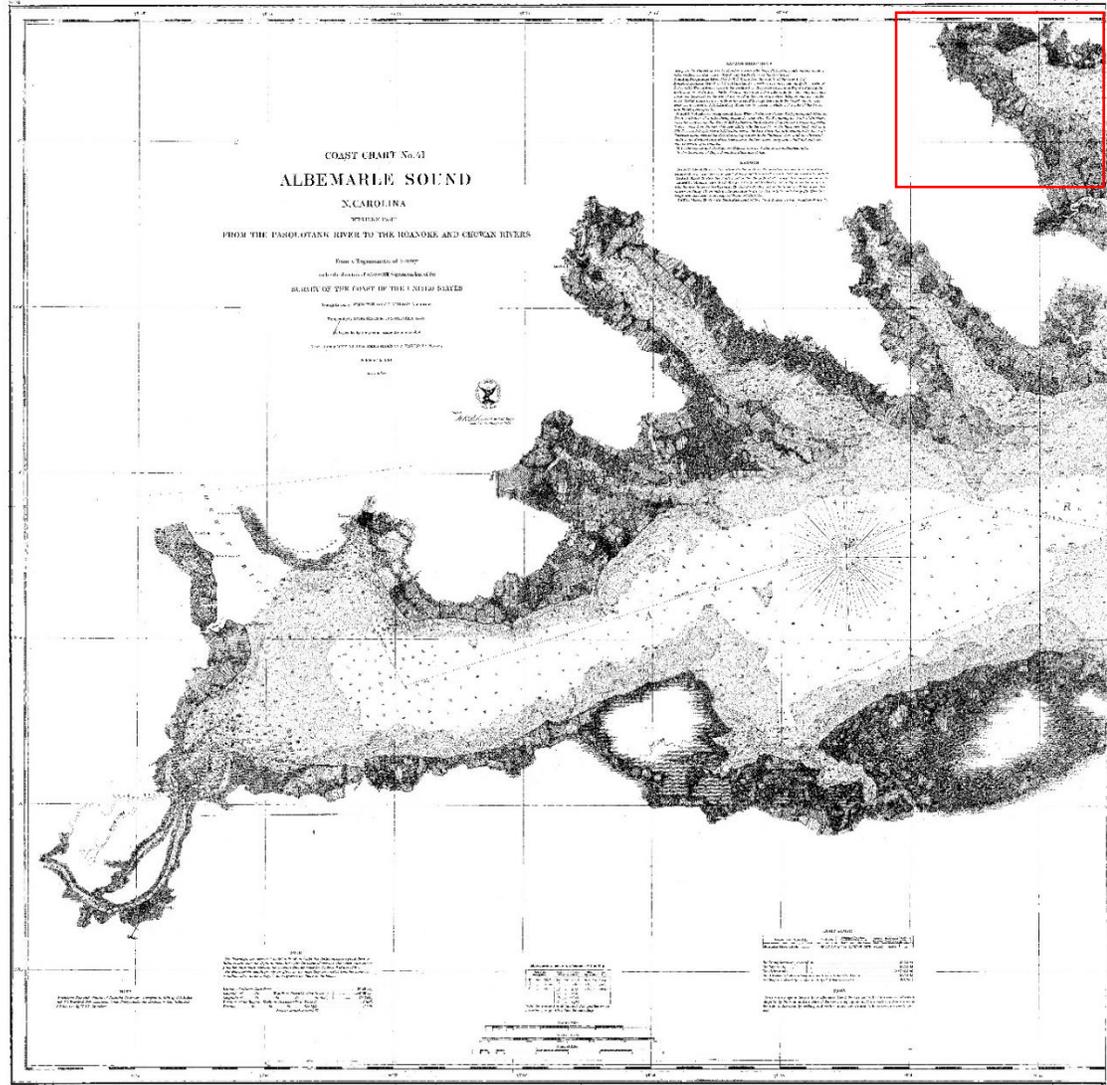


Figure 14: Coast Chart No. 41 (USCGS 1860. NOTE: Area outlined in red is Elizabeth City and the Pasquotank River).

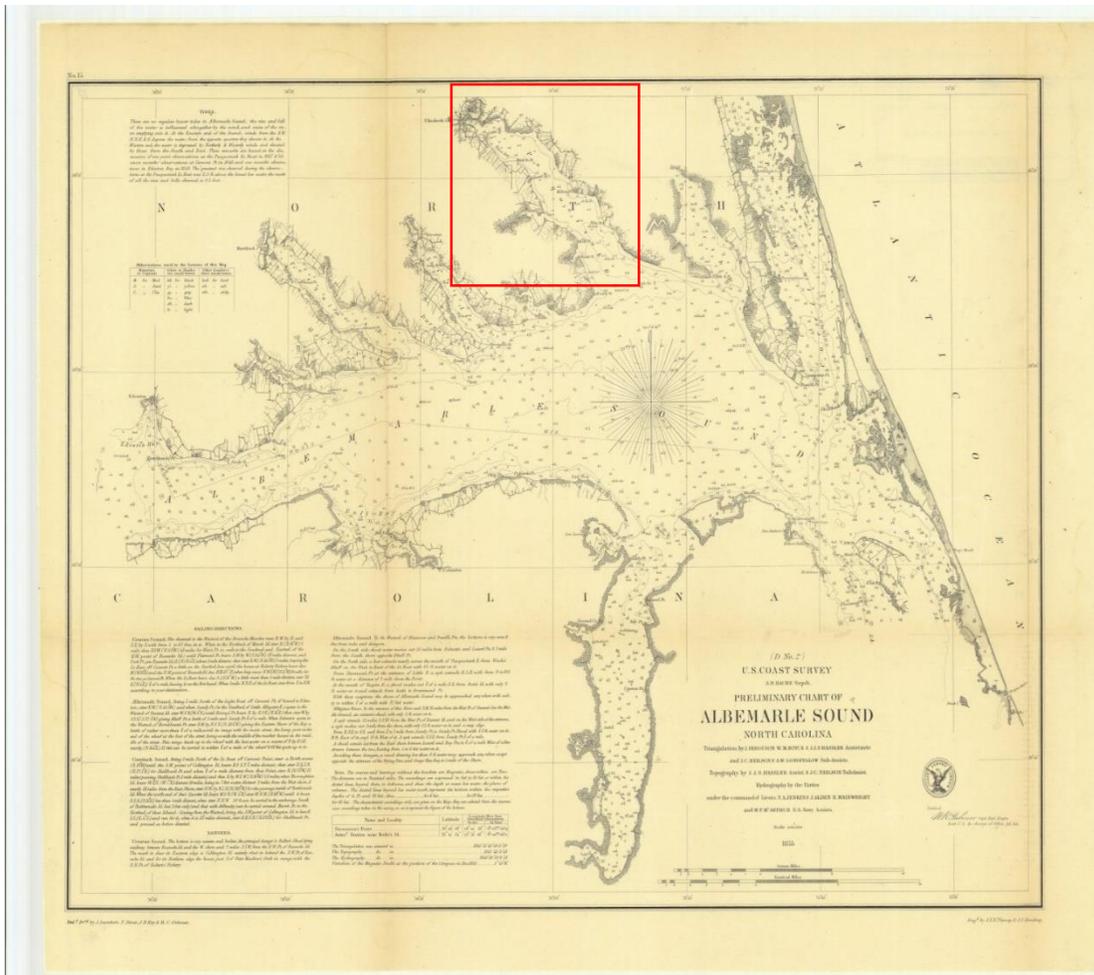


Figure 15: *Coast Chart D No. 2* (USCGS 1855. NOTE: Area outlined in red is Elizabeth City and the Pasquotank River).

*Coast Chart D No. 2* was then georeferenced to *Coast Chart No. 41*. Because *Coast Chart D No. 2* was closer in time to *Coast Chart No. 41* as opposed to the NOAA base map, the landscape it represented was more closely related to that shown by *Coast Chart No. 41*. This is important because the Pasquotank River shown by *Coast Chart D No. 2* extended further than *Coast Chart No. 41*; the two needed to align in order to make use of the sounding data both maps contained. The same seven points used to georeference *Coast Chart No. 41* to the base map were used in georeferencing *Coast Chart D No. 2* to *Coast Chart No. 41*.

With the historic maps matched as closely as possible to the modern base map, the historic landscape was then traced in five different layers. First, the shoreline as a whole was

created. Next, land marked as marshlands was identified before areas marked as uncleared land or woodlands were traced. Lastly, the area encompassed by Elizabeth City proper was created. All features were first generated as line features before using the “Feature to Polygon” tool to transform them into polygon features. Neither historic map showed any roads leading to or from the city or in the surrounding farmland, so no roads were shown nor were any individual structures within the city, as neither map offered that level of detail (Figure 16).



Figure 16: Digitized Historic Landscape of Elizabeth City and the Pasquotank River circa 1862 (By Adam Parker).

### *Creation of the Bathymetric Models*

The next step in creating the model was to show the historic and modern river bathymetrics for two reasons. First, knowing the historic bathymetry would allow placing both fleets in areas where it was known they could operate considering their draft limitations. Next, by making a bathymetric model from both historic and modern data, any dredging operations that may have occurred in the river could be observed. Dredging operations would disturb any material culture, therefore complicating an archaeological survey.

Each bathymetric model was completed in two steps. The first step was to assign points to the shoreline. Each point along the shoreline was given an attribute of zero, indicating that there was no depth. This point layer was saved and then exported as two separate files, where either the historic sounding data from both *Coast Chart No. 41* and *Coast Chart D No. 2* were input or sounding information from the NOAA base map was input (Figures 17 and 18). Each point was then given a numerical attribute of depth based on the information provided by the cartographic sources. The “Natural Neighbor” spatial analyst tool was then used to create both images as continuous raster images (Figures 19 and 20). After establishing that no significant dredging operations had occurred in the river (the most significant having happened north of the city where the Dismal Swamp Canal began) the combatants could then be placed in their correct spatial positions.

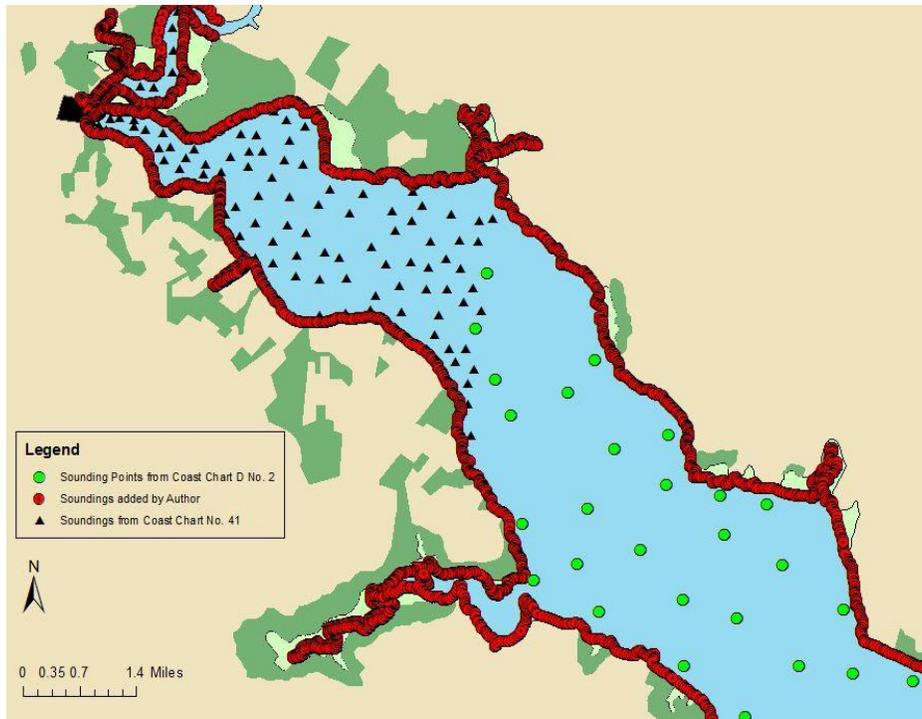


Figure 17: Digitized Historic Soundings of the Pasquotank River (By Adam Parker).

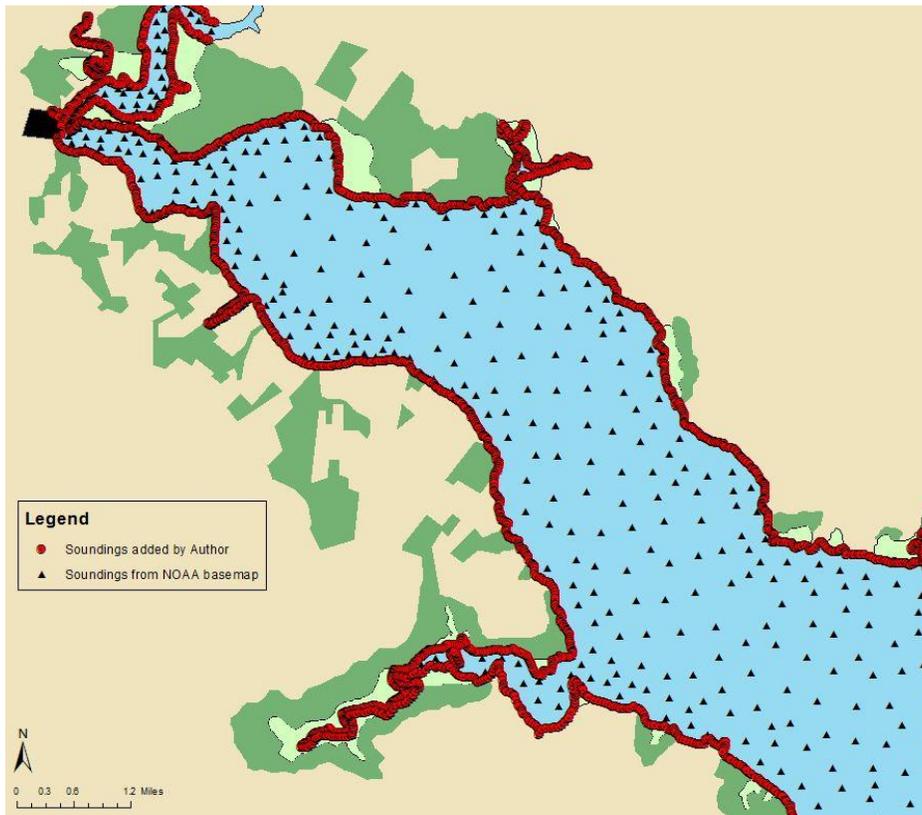


Figure 18: Digitized Modern Soundings of the Pasquotank River (By Adam Parker).

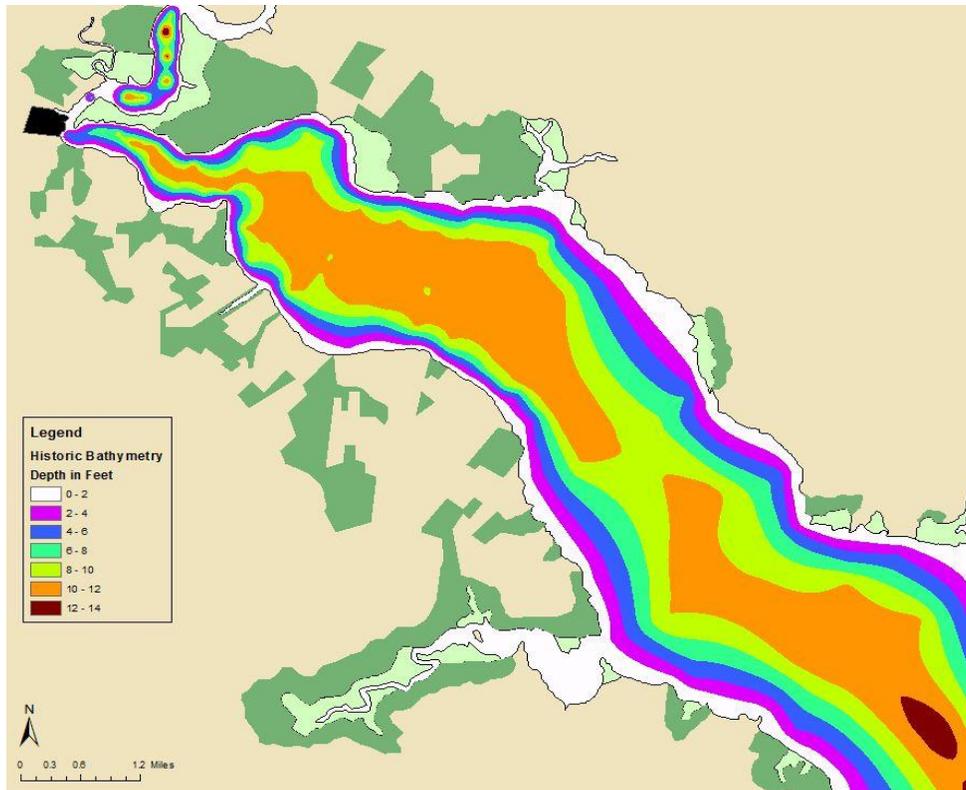


Figure 19: Historic Bathymetry Raster Interpolated from Digitized Soundings (By Adam Parker).

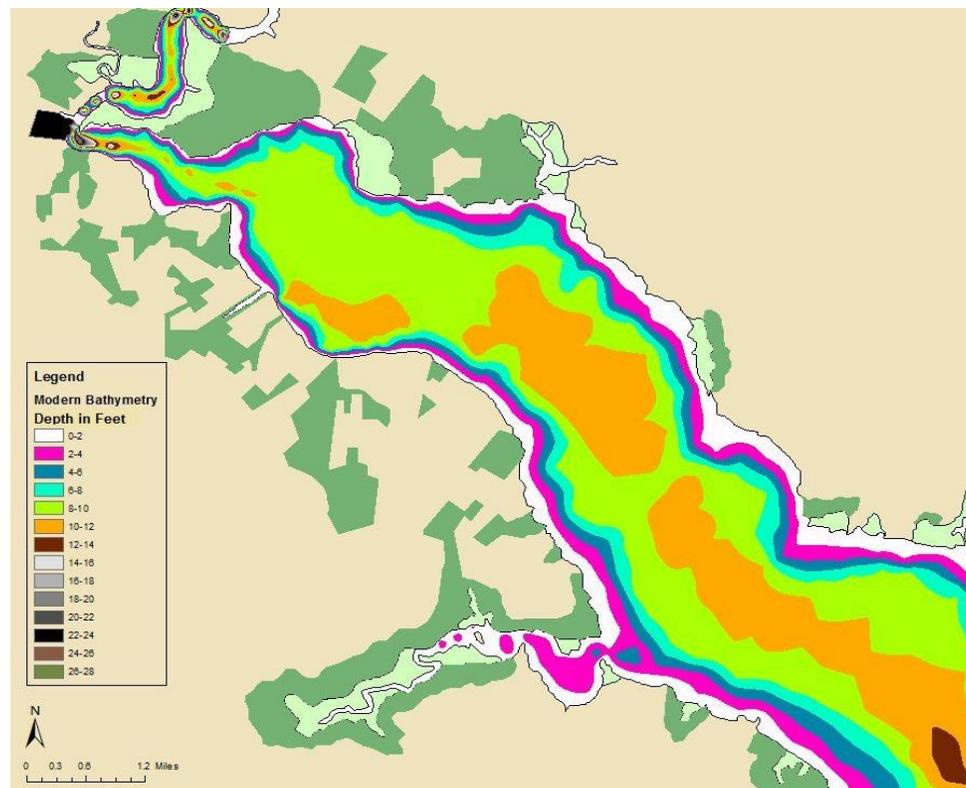


Figure 20: Modern Bathymetry Raster Interpolated from Digitized Soundings (By Adam Parker).

### *Creation of the Fleet Formations*

The next step was to create the fleet formations. Each is dependent largely on historical data. The Confederate fleet's positioning is largely dependent on three sources of evidence: the historic bathymetry of the Pasquotank River in the primary engagement area (Figure 21), historic evidence from Midshipman Robert Camm's signal book (Camm 1862), and archaeological data from the site of CSS *Black Warrior* (Lawrence and Henry 2002). The site of CSS *Appomattox* is further up in the Dismal Swamp Canal, having been burned by the crew after the tug was too large to fit through the locks at South Mills, North Carolina (Meekins 2007:29). As such, its position after sinking was not used in compiling GIS data for Confederate positions during the battle.

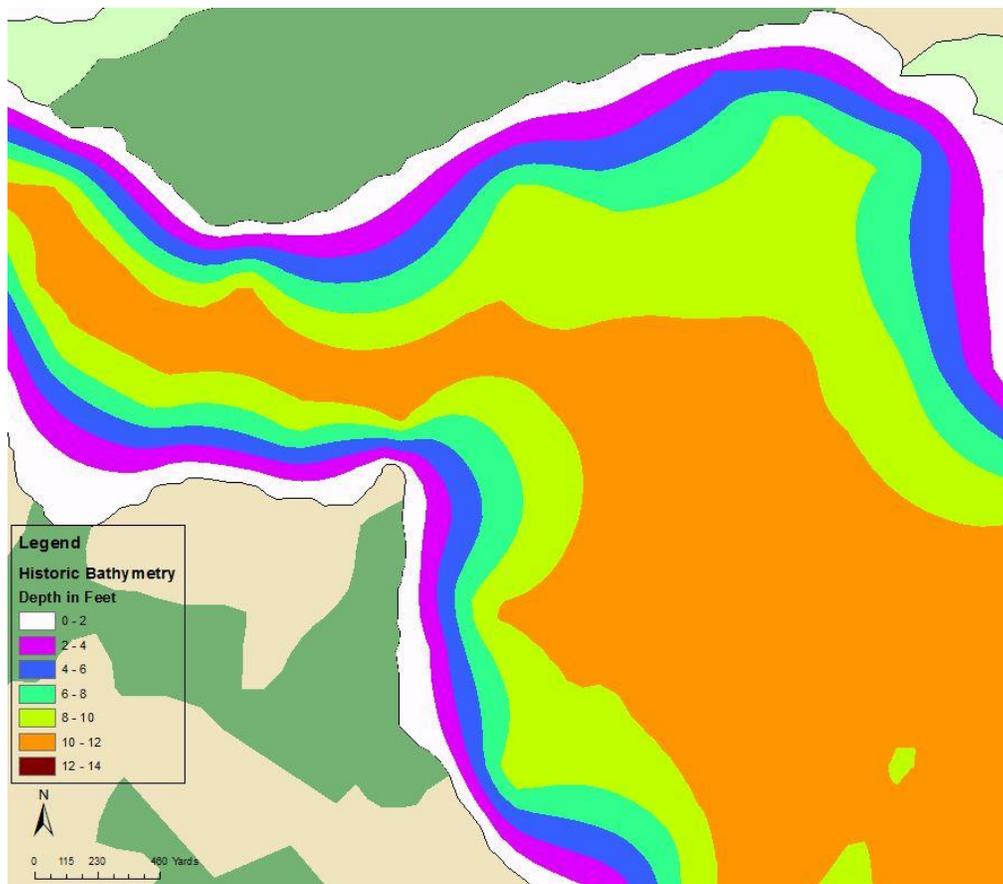


Figure 21: Historic Bathymetry of the Primary Engagement Area (By Adam Parker).

Each vessel had to be in enough water to accommodate its respective draft. To account for a lack of historical data about the Confederate vessels, the deepest channel, which is found in the middle of the river, was used. From here, the relative position of Confederate fleet was mapped. The historical data state that the Southern fleet was drawn up between one-quarter and one-half mile above Fort Cobb (Traver 1880:28; Allen 1887:77). A middle distance of three-eighths of a mile was used for the Confederate position, drawn in a straight line upriver from Cobb's Point where it extended furthest into the river.

Finally, the location of *Black Warrior* during the battle needed to be determined. During the 1999 and 2000 field seasons, North Carolina's Underwater Archaeology Branch (UAB) located and mapped the wreck of *Black Warrior* (Lawrence and Henry 2002:1-4). Two large site features, the wreck itself and an associated debris field, were located 285 feet (86.87 meters) apart. Lawrence and Henry (2002:2) concluded that the debris field was probably the schooner's position during the battle when it was first set ablaze by the crew and that the wreck's modern position was where it came to rest after a short period of drifting towards shore. The coordinates for the *Black Warrior*'s modern position were entered in the GIS model and then a line was measured out 285 feet from that site into the river. This position placed *Black Warrior* in four to six feet of water. Knowing from the UAB report that the vessel's draft was seven feet, the initial position was rejected and the proposed transect extended further until it reached an area of the river that would accommodate the draft, resulting in a position nearly straight across the river from Fort Cobb. The fleet formation will be discussed further in Chapter 5.

For the Union formation, surviving battle reports by the officers present at the battle formed the basis for the formation. Commander Rowan's orders to his officers the night before battle were to form three columns. The first would be made up of *Morse*, *Delaware*, *Commodore*

*Perry, Underwriter* and *Ceres. Delaware*, serving as Rowan's flagship, would be the leader in the first column. *Louisiana* would head the second column and the third would be led by *Hetzel* (Rowan 1862b:607). From the report of Lieutenant Murray of *Louisiana*, it is known that *I.N. Seymour* and *Lockwood* were also in his column (Murray 1862b:609). This would mean that the rearguard, along with *Hetzel*, was composed of *Valley City, Henry Bricker, Whitehead,* and *Shawsheen*. The ship positions within each column are largely based on battle reports.

This three-column formation (discussed in further detail in Chapter 5) was used at two different stages in the GIS modeling: once at two miles from Cobb's Point, when the Southern forces at Fort Cobb and select vessels began firing on the approaching Federal fleet (Woodward 1862:619) and once again at three-quarters of a mile from Cobb's Point when Commander Rowan gave the orders to dash at the enemy (Rowan 1862b:607). Both relative positions were formed the same way; the relative fleet formation of the Confederate line was formed by drawing a line straight downriver from the most extended point of Cobb's Point to the correct distance. With the positional data taken into account, the vessel measurements were drawn to scale before being placed in their final positions according to the known evidence. While both fleets' placement is based on available data, it must be noted that the model's ship positions are still abstractions and may not represent the *exact* positions during battle.

### *Fort Cobb*

Fort Cobb was the four-gun shore battery used by the Confederates during the battle. The fort was named for the point it was located on, roughly two miles below the city. According to Creecy (1901:222-223), Colonel Lucien D. Starke had erected only breastworks and not a fully enclosed fort early in late 1861. This is confirmed by Colonel C.F. Henningsen (1862:191) who stated that the fort was vulnerable to enfilading (flanking) fire. Despite attempts to raise and

impress a labor force of slaves to construct flanking traverses for the battery, this action did not take place (Heningsen 1862:191). Further archaeological data about the shape of the fort's shape cannot be gathered due to housing development on the point. Therefore, for this GIS model, Fort Cobb was considered to have been a single fortification wall, facing downriver and was modeled as a line feature (Figure 22).

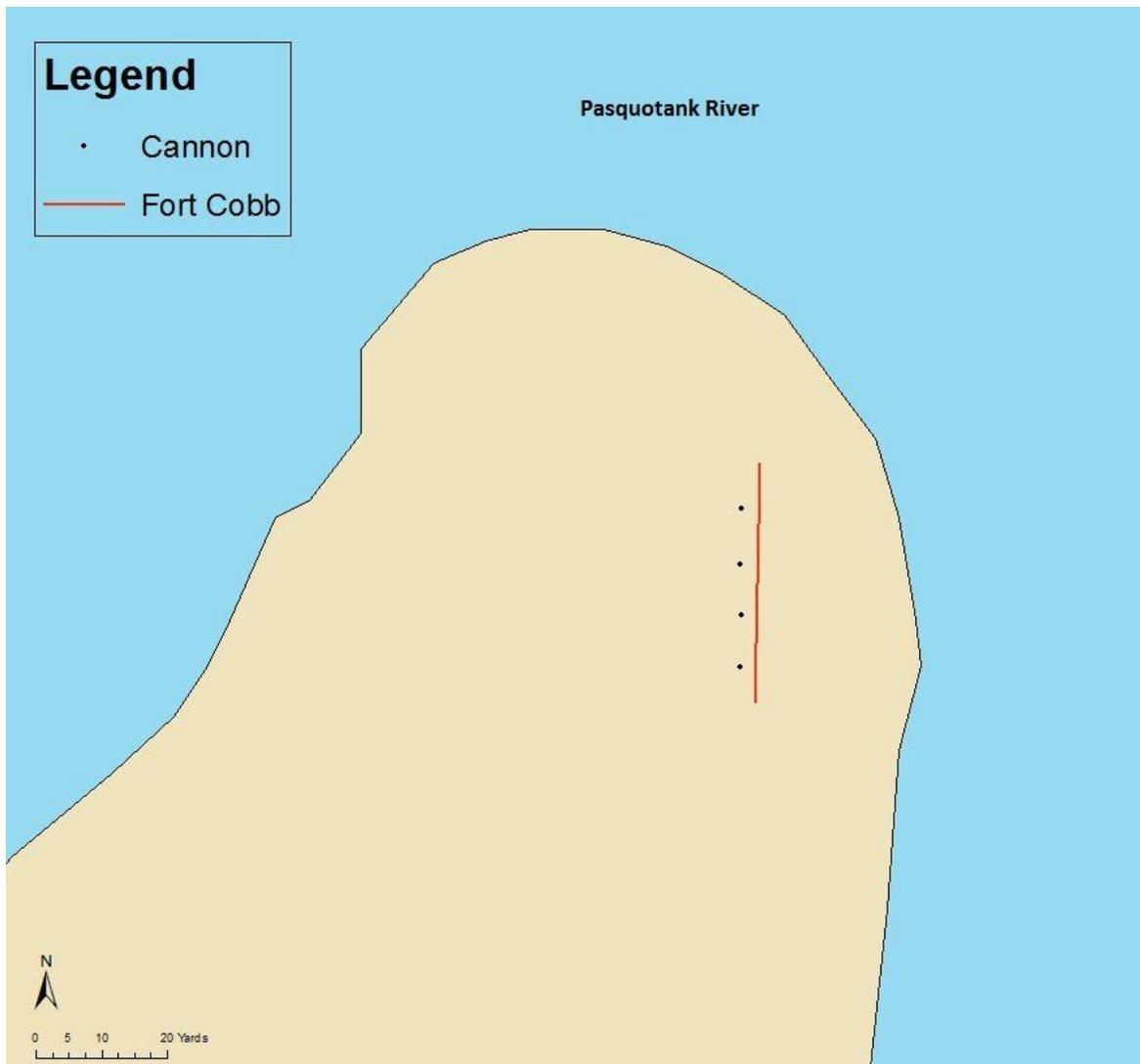


Figure 22: Digitized Fort Cobb (By Adam Parker).

The fort's four cannons, all were 32-pounder smoothbores (Parker 1883:234). The guns were of good quality, but poorly mounted and three of them could only fire downriver. Only one could be fired across the river. In considering fields of fire, this means that the three that could

only be fired downriver were mounted *en embraiture*. This means they could have only fired in a 45 degree arc through a narrow opening. The fourth, which could have been fired across the river, would have been mounted *en barbette* which would have allowed a 180 degree arc of fire (National Park Service 2013).

Finally, one of the sailors aboard *Louisiana* stated that Fort Cobb was not observed until it opened fire on the fleet (Blanding 1886:105). This would mean that a stand of trees was concealing the battery or that it had been sodded over to reduce its visibility. However, it must be noted that no other sources make this observation. Without placing the fort within a stand of trees, which would have blocked its fire, Blanding's observation was used to place the fort near a stand of trees noted on the historic map sources.

#### *Drawing the Ships to Scale*

After each formation was determined, each ship was then generated to scale in the model according to vessel statistics taken from the *Official Records of the Union and Confederate Navies*, the Naval History and Heritage Command online database, and the UAB report on *Black Warrior* (Lawrence and Henry 2002). Each vessel took five steps to create (Figure 23). After each vessel was drawn, it was placed in formation and the shapefiles were then exported three times to be used for later interpretive battle representations through time without having to redraw each ship again, possibly introducing error in the model.

#### *Placement of the Naval Artillery*

Each ship's cannon was positioned as separate point layers. As both fleets were meeting head on, only information for bow guns was used. The only time a stern gun occurred according during *Appomattox's* retreat (Jeffers 1862b:611). Thus, this is the only time a stern gun was represented in the model.

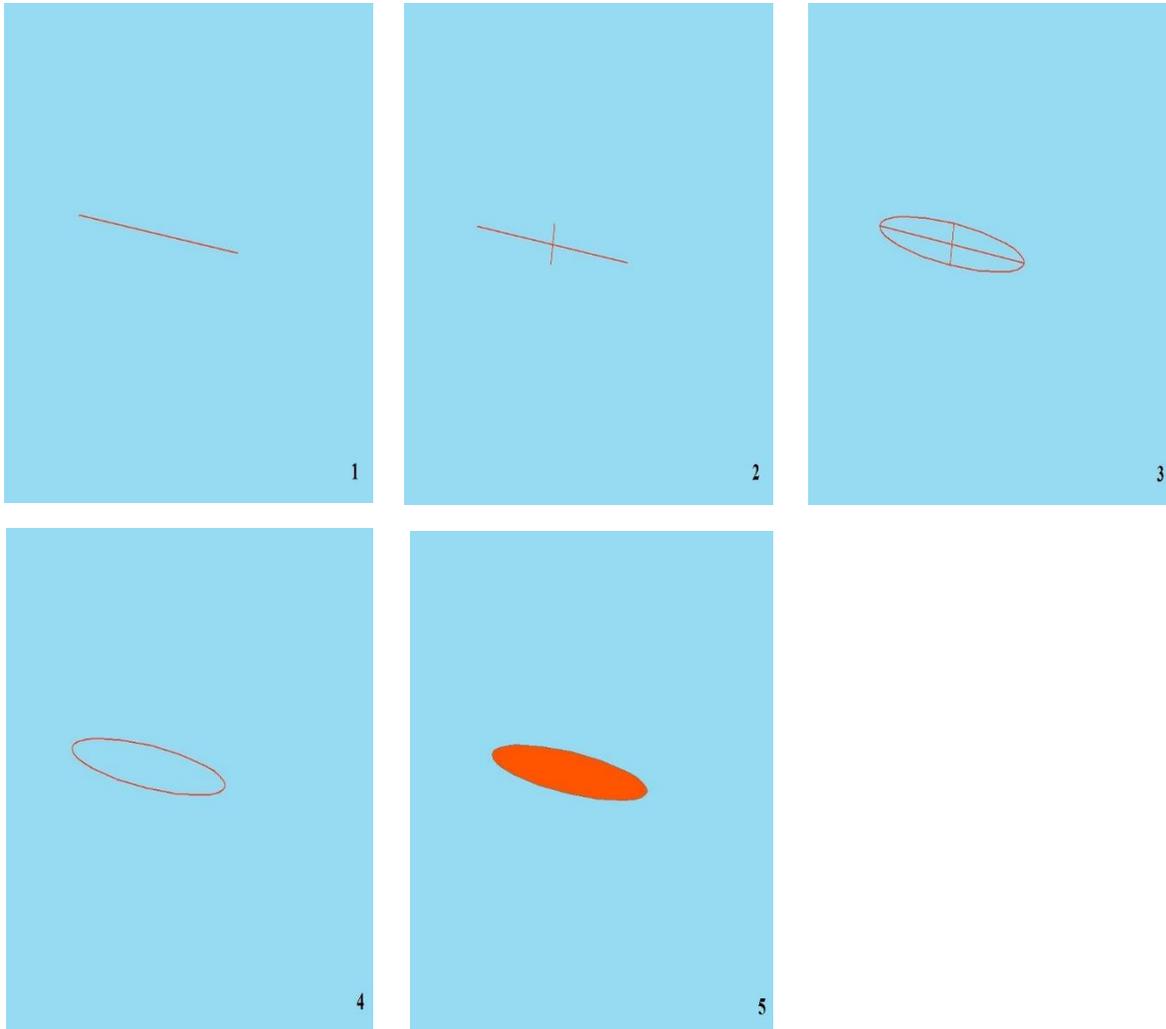


Figure 23: Process of Drawing Ships to Scale (1. A line feature is drawn to the specific ship's length; 2. A separate line feature is drawn to the specific ship's breadth; 3. A final line feature as an ellipse is drawn in to the dimensions of the previous two lines; 4: The original lines are removed; 5. The ellipse line feature is then converted to a polygon feature) (By Adam Parker).

Positioning the bow guns on each ship proved to be difficult. For some vessels, such as *Commodore Perry*, there are historic photographs that help determine where the guns were located and which way they pointed. For the majority of the Union vessels, surveys of the armament were conducted in January of 1861, but they may lack historical photographs to tie the information to placement on the vessel. Finally, if there are any images of the Confederate vessels, they exist only in newspapers, which does not help if they were armed with more than one heavy gun.

If the types of guns on a ship were known and photographic evidence was available, this was used to place each cannon in its proper place. If the armament was known but no photographic evidence was available, the farthest reaching, most accurate gun was placed at the bow of the ship to offer the most tactical power to a single vessel. Rifled versus smoothbore and effective ranges were both taken into consideration. This same method of placing cannon was also applied to the Confederate vessel *Sea Bird*, which was also known to have a battery of two heavy guns.

One last item of note are the 80-pounder guns used by the Union fleet. There is one statement recorded by Lieutenant Davenport of USS *Hetzel* about positioning its 80-pounder. Speaking of when the gun burst on 7 February 1862 at the Battle of Roanoke Island, he specifically states that the gun was positioned in the ship's stern (Davenport 1862a:559). This information was used to designate 80-pounder guns to the stern of a vessel, except in one case. The battery on *Lockwood* included two howitzers and one 80-pounder gun. In this case, it was assumed that the superior fire power would have been positioned as the forward gun on *Lockwood* (Department of the Navy 1921b:114). As no range statistics are available for 80-pounder guns, *Lockwood* is the only vessel in the model without an associated field of fire.

#### *Creation of Fields of Fire*

Taking the range statistics of each naval gun, both the effective and maximum ranges of each gun were mapped out. In the model, this information helps explain whether either combatant group was firing effectively or in a rushed, inaccurate fashion. Further, the question of how each gun was mounted came into question. Although it can be argued the majority of all the guns were mounted on pivot mounts (Silverstone 2006:xix), the *Official Records* did not explicitly contain these data. Therefore, each field of fire was created as though the guns were

modeled were limited to a 45 degree arc, much like Fort Cobb's guns. While this assumption may be incorrect, it must be noted that because all the ships involved in the battle were steamers, save *Black Warrior*, they were free from winds and effectively had a 360 degree range of fire. Therefore, this is another case in which the GIS model becomes an interpretive tool and is not a perfect representation of the battle as Simonds (2014:28) states. *Black Warrior's* guns were mounted on traditional truck carriages, as evidenced from the archaeological excavation of the site (Lawrence and Henry 2002:5).

Taking each cannon point, the maximum range was first buffered, followed by the effective range. A single line represented the line of fire if the cannon were pointed directly forward was extended through both range buffers. Lines were then offset 22.5 degrees on either side of this original line. The original line was then cut out and an arc line was used to connect the full 45 degree angle. The line feature was then saved and converted to a polygon. Each effective range was laid over the maximum range to show the difference between the two. This same process was then repeated for the next cannon point as well as the three southern guns of Fort Cobb and each ship gun (Figure 24). The individual ranges for each ship can be found in Appendix B.

For the northern gun at Fort Cobb, which is assumed here to be mounted *en barbette* based on the historical data, a similar process was used. Both maximum and effective ranges were buffered from the point. From here, a straight line was drawn from one edge of the maximum range buffer to the other side at 180 degrees. This allowed representation of its 180 degree arc of fire. However, care was taken to position the end of the firing range. It was the only gun that could be pointed across the river; however, it could not be brought to bear on the Union fleet after it passed Cobb's Point due to poor mounting (Parker 1883:240). The extent of the

cannon's range was then placed at a point across the river, but not extending above Cobb's Point.

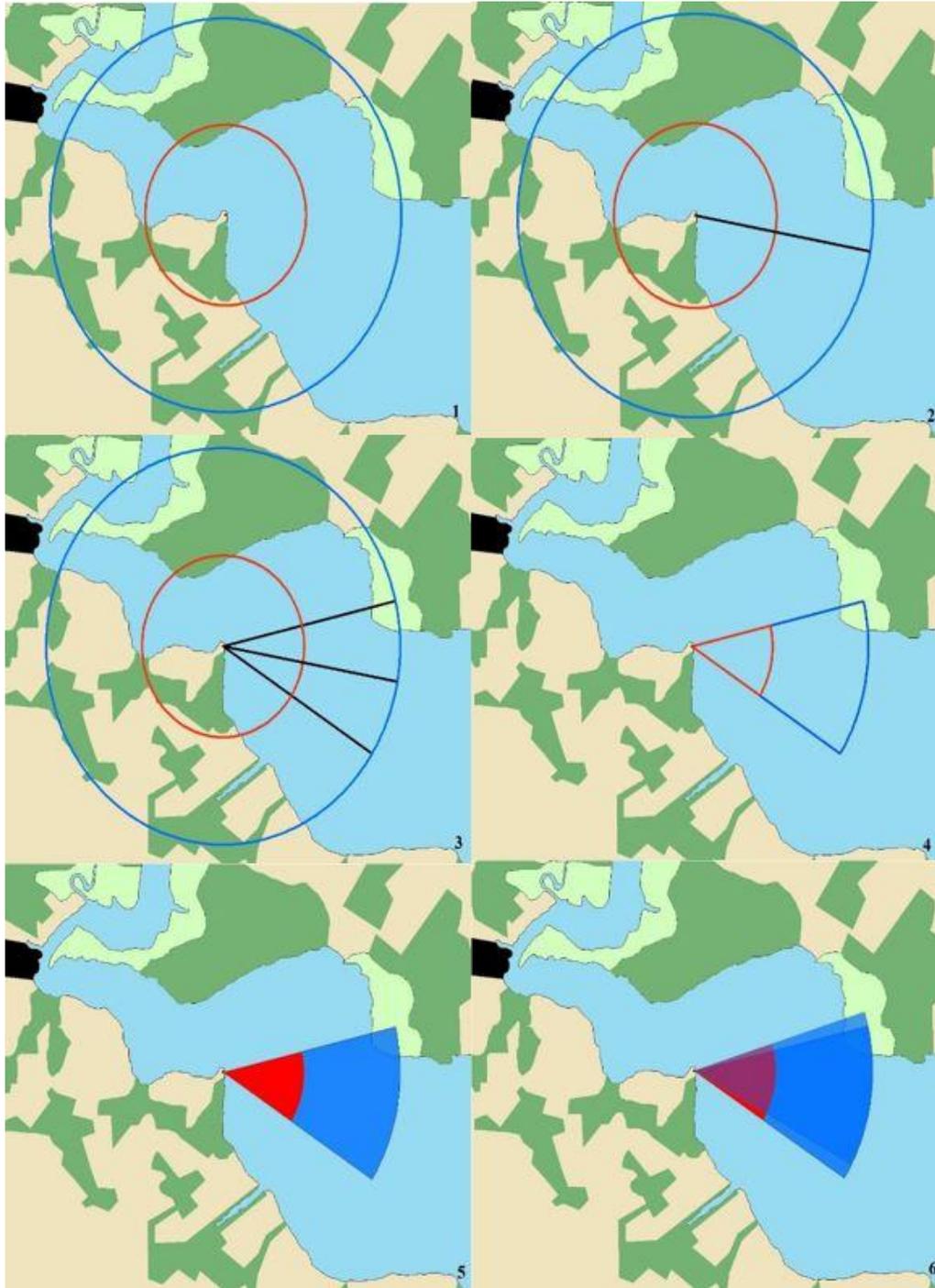


Figure 24: Creation of the Fields of Fire (1. Each Cannon Point is buffered twice for the effective [red] and maximum [blue] ranges; 2. A line feature is then drawn to the edge of the maximum buffer to represent each cannon's dead ahead line of fire; 3. A line is offset by 22.5° on either side of the first line; 4. The excess lines are removed; 5. The line features are converted to a polygon; 6. The process is repeated) (By Adam Parker).

### *Temporal Representation of the Battle*

As stated in the introduction, the battle was not only modeled spatially but also temporally. Using primary sources from each combatant group, four battle stages were identified:

Stage One: The Confederates begin firing while the Union fleet is two miles away.

Stage Two: Within .75 miles of the Confederate position, Rowan makes signal to “Dash at the Enemy” and the first two Federal columns begin firing.

Stage Three: The rearguard of the Union Fleet comes into position and begins firing on Fort Cobb. *Commodore Perry* fires a single shell and musket volleys at *Fanny*.

*Underwriter* breaks the Confederate line to pursue *Beaufort* and *Appomattox*. The close-quarters action limits the fire of the Union rearguard.

Stage Four: *Commodore Perry* rams *Sea Bird*. *Ellis* is boarded by *Ceres*. Several Union ships surround the disabled *Fanny*. *Underwriter* exchanges fire with *Appomattox* while *Beaufort* steams ahead.

The goal of dividing the battle into temporal segments as well as spatial zones was to examine the relationships between each combatant unit with other units and the landscape. Looking at both the temporal and spatial relations allows for a more detailed, in-depth, and complete examination of the engagement. It must be noted here that during this process, some officer’s reports were more detailed than others. If sufficient data was not provided by the officers, some vessels in the model remained static and unmoving except for a general forward advance. The exception is *Ceres*. Although no battle report survives from Acting Master MacDiarmid, other officers give information as to its actions during the battle (Rowan 1862b:607; Hotchkiss 1862:621).

With the model complete with both spatial and temporal references, the fields of fire could be examined to establish potential zones for an archaeological remote sensing survey to be conducted where material culture (namely the expended artillery ammunition to help define battlefield boundaries) might be located in the riverbed and the yet undiscovered wreck of CSS *Sea Bird* (Figure 25). The next step after establishing two survey zones was to establish whether there was sufficient potential to be able to locate the expended iron ammunition by using

magnetometry modeling software.

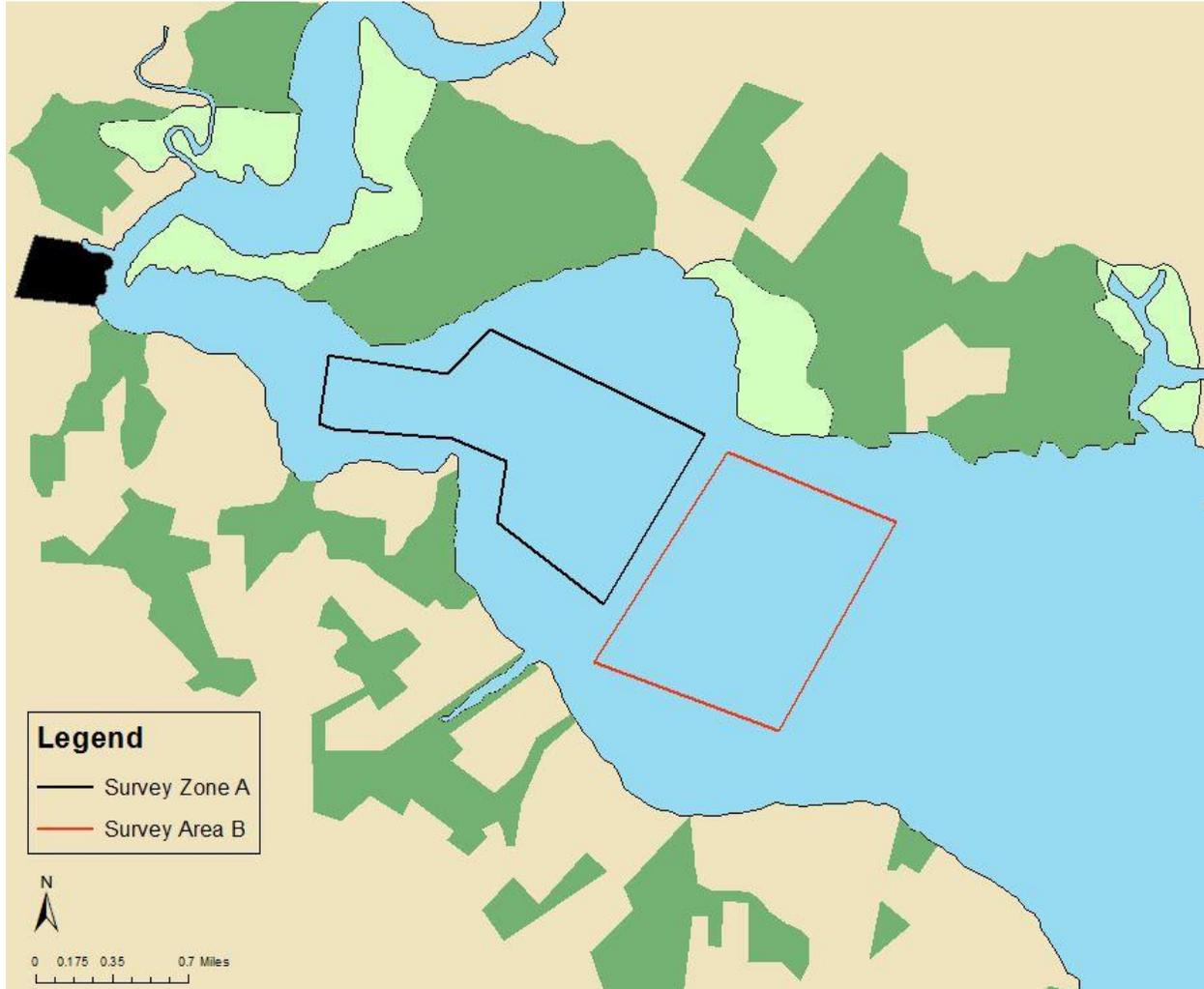


Figure 25: Survey Zones for Remote Sensing Survey based on Historical Data (By Adam Parker).

### Magnetometry Modeling

The software used to construct the potential magnetic anomalies (spent artillery ammunition) model was *pBlock*. While this software is not meant for archaeological modeling, it still offers an approximation for determining a potential target's magnetic strength. Richards (2011) used this software for modeling purposes to identify single mines from the Battle of the Atlantic (1942) in the Cape Hatteras minefield. Since *pBlock* software is intended for geophysical survey and not archaeological survey, the same problems Richards encountered

(Richards 2011:3-4) were also observed in the present study, specifically in estimating iron's susceptibility and the appropriate traverse lengths to use (Richards 2011:4). Nonetheless, *pBlock* software was shown in the Cape Hatteras minefield model to be effective in determining the magnetic strength of a Mark VI Sea Mine (Richards 2011:5). With a successful precedent set, *pBlock* was used for the present study to determine the strength of magnetic anomalies.

For the purpose of this study, a 32-pound piece of solid round shot was used for the modeling. The reason for this was that shells for the naval pieces would differ only slightly in dimensions from a 32-pound piece of solid shot and that 32-pounders were used in both fleets (Tables 2 and 3). *PBlock* software does not take the direct weight of an object into consideration in calculating magnetic signatures. Instead, its algorithms focus on the object's size, its depth, traverse length and the iron's density to generate the object's mass. Furthermore, as *pBlock* is used to determine a piece of solid iron, the hollow area within a shell may not be correctly accounted for. Naval 32-pounders were found in both fleets and round shot was recovered from the wreck of *Black Warrior* (Lawrence and Henry 2002:4). Thus, 32-pounder shot was therefore determined to be representative.

The size of a 32-pound cannon ball is roughly six inches (0.1524 m) in diameter. The software called for metric measurements within one decimal place and so the size was rounded up to .2 meters. Since a cannon ball is a sphere, this measurement was used for both width and height variables. The average density of iron, 7.6 gm/cc, was used. All other variables except traverse length and water depth were taken from Richards' 2011 modeling (Richards 2011:2). The earth's latent magnetism in North Carolina is roughly 45,000 gammas and iron's susceptibility is 12.5 cgs (Breiner 1973:6). For the purpose of the modeling, traverse lengths of 50 meters, 100 meters, and 200 meters were used. To account for the Pasquotank River depth,

two meters, three meters, and four meters were used (Table 1).

TABLE 1: *pBlock* Variables and Strength of Magnetic Anomaly.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Depth (m)	2	2	2	3	3	3	4	4	4
Width (m)	.2	.2	.2	.2	.2	.2	.2	.2	.2
Height (m)	.2	.2	.2	.2	.2	.2	.2	.2	.2
Strike Length (m)	.2	.2	.2	.2	.2	.2	.2	.2	.2
Sucs. (SI,=12.5*cgs)	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Density (gm/cc)	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
H (nT)	45000	45000	45000	45000	45000	45000	45000	45000	45000
Inclination (deg)	-65	-65	-65	-65	-65	-65	-65	-65	-65
Declination (deg)	0	0	0	0	0	0	0	0	0
Traverse Bearing (deg)	0	0	0	0	0	0	0	0	0
Traverse Length (m)	50	100	200	50	100	200	50	100	200
nT +	66.9	56.9	56.6	20.5	20.2	17.6	9.0	9.0	7.6
nT -	8.8	8.8	8.8	2.8	2.8	2.4	1.2	1.2	1.2
Total Field (nT)	75.7	65.7	65.4	23.3	23.0	20.0	10.2	10.2	8.8

The models showed significant differences in the gamma range that could be expected from a 32-pound round shot. The visual dipole of each model can be found in Appendix A. A depth of two meters showed the highest range with the highest hit being a total of 75.7 gammas on a traverse length of 50 meters. Traverse lengths of 100 meters and 200 meters showed gamma returns of 65.7 and 65.4 gammas, respectively. At a depth of three meters, the gamma returns drop to the 20 gamma range. A traverse length of 50 meters had a return of 23.3 meters; 100 meters had a return of 23.0 gammas; and a traverse of 200 meters had a return of 20.0 gammas. Finally, the weakest returns were found at four meters depth. Traverse lengths of both 50 and 100 meters both showed target gamma strength of 10.2 gammas and a traverse length of 200 meters

showed a return of 8.8 gammas.

According to the project base map and modern sounding data taken by NOAA, the project area, Zone A, had an average depth of 2.44 to 3.05 meters (8 to 10 feet) (Figure 26). There were three holes in the middle of the channel around Cobb's Point that dropped to between 3.66 and 4.26 meters (12 to 14 feet) (Figure 26). Areas closer to either river shore in the study area were 1.83 to 2.44 meters in depth (6 to 8 feet). With the modern bathymetric model and the magnetic modeling through *pBlock*, it was decided that there was some potential to pick up small magnetic anomalies such as a 32-pound solid shot with a magnetometer.

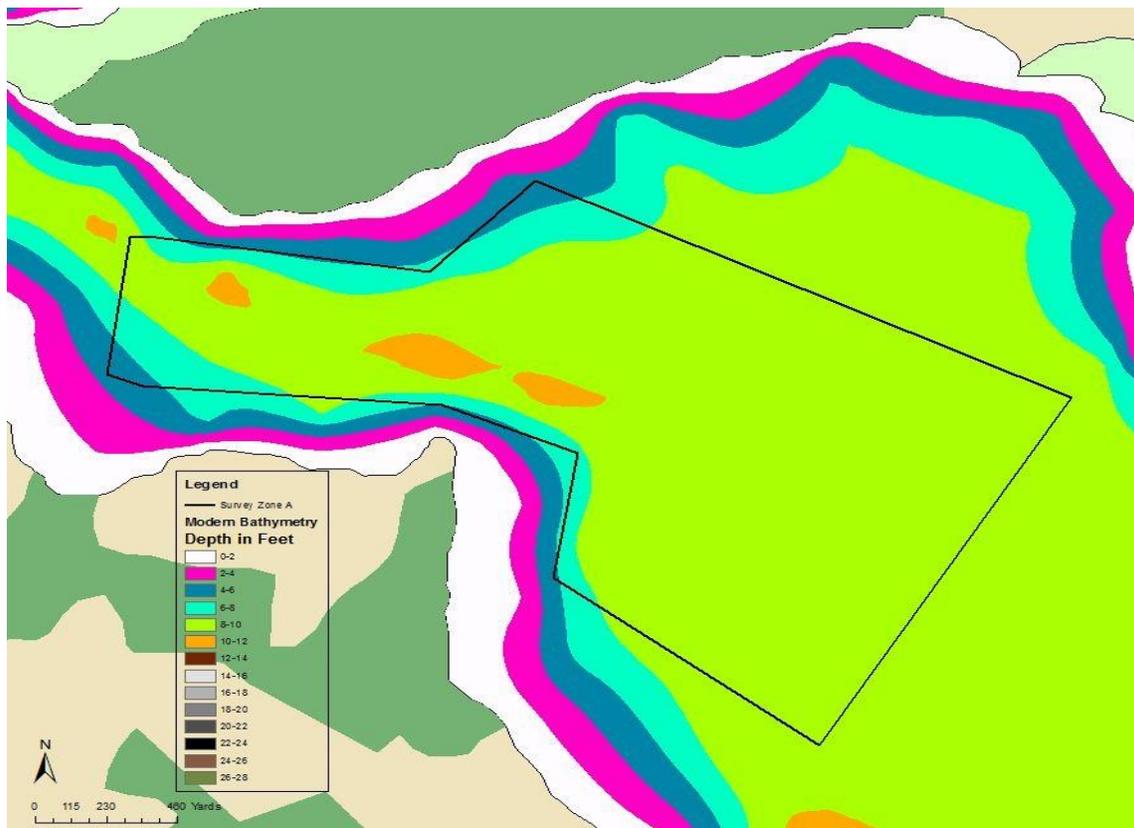


Figure 26: Bathymetry of Primary Survey Area (By Adam Parker).

## Archaeological Survey

A limited remote sensing survey of the battlefield was conducted on 8 and 9 December 2014. Both a magnetometer and a side scan sonar were used. The magnetometer was a

Geometrics G882 Cesium model and the side scan sonar used was a Klein 3000H Dual Frequency (500/900 kHz) model. To record positioning, a Trimble AgGPS542 global positioning system (GPS) was used. The magnetometer was on loan from East Carolina University's Program in Maritime Studies while the side scan sonar and GPS were provided by University of North Carolina's Coastal Studies Institute. All data were recorded through Hypack Incorporated's *Hypack 2014* software. The research vessel, R/V *Viper*, was on loan from East Carolina University's Water and Diving Safety Office.

Because the project was self-financed, several compromises were made particularly in regards to lane spacing. Ideally, the project would have taken a week to complete, the first few days consisting of a side scan survey before lane spacing was tightened for a magnetometer survey. In both cases, 100 percent overlap between the lanes would have been ideal, however, because of the project's limited funding, both systems were run at the same time and at a lane spacing that allowed surveying a significant portion of the site. The drawbacks associated with this will be discussed further in Chapter Five. Working with both remote sensing devices at the same time led to the decision to use a lane spacing of 40 meters and a 50 percent overlap.

Furthermore, even with the increased lane spacing, the ability to research both survey zones was not possible. Therefore, only the northern survey zone, Zone A, was surveyed. There are several reasons for this: first of all, this zone also represented the primary engagement area of the battle. Second, this is the area with the most potential of finding the remains of the Confederate flagship, *CSS Sea Bird*. The southern survey zone, Zone B, was eliminated for consideration in the survey due to funding, time, and because it represented the approach of the Union fleet into Confederate fire. The potential of pinpointing the area where the Confederates began firing on the Union fleet, whether it was really two miles from the Confederate position or

closer was the purpose of this survey zone. The primary engagement zone took precedence over this in the end.

Following the survey, the magnetometer data files were edited in *Hypack 2014* software to account for any interruptions the towfish may have encountered during the survey such as wave action against the boat's hull, the energy from which would have disrupted the magnetometer cable, causing the towfish to pitch. The data was then interpolated in Geometrics' *Magpick* software. Due to issues concerning the large spacing between lanes, it was assumed before the editing process that the magnetometer data would be distorted upon interpolation. Therefore, during the editing process, each potential target was entered into a spread sheet. Targets were determined by three criteria: strength of the magnetic hit, location in the river, and hit duration. The relatively small size of a 32-pound round shot (6 inches or smaller if considering an exploded shell) meant that if a hit registered at least 10 gammas and had a one half second or longer duration, it was considered to potentially be a spent artillery ammunition. The three criteria were the cut off point because the *pBlock* models showed that in 4 meters of water, the magnetic hit's strength could be as low as 10 gammas. After being edited, the magnetometer data was sorted several times. Both survey days were sorted individually with radii of 5, 10, 20, and 40 meters. They were then combined to be sorted in the same fashion together. Following this, the sorted files were then imported into Geometric's software program *Magpick*, interpolated and contoured, exported as a GeoTiff image, and imported to the GIS model as a raster image.

Although sonar data were recorded in *Hypack 2014* during the survey, they were processed using Chesapeake Technology's *SonarWiz5* software. The individual sonar files were first manually bottom tracked. The files were then examined visually to locate targets that were

then put within a classification system of target type defined by the author. There were no expectations to find an artifact as small as a 32-pound solid round via sonar; however, if any remains of CSS *Sea Bird* were uncovered, it was hoped that the sonar would give additional information on its location. Additionally, the sonar data served as a check on the magnetometer data, as a way to eliminate magnetic hits from consideration, as in the case of a crab trap. Finally, the data were exported as a GeoTiff image as well and then imported into the GIS model as a raster image.

By importing both magnetometer and side scan sonar datasets into the GIS model, relationships between both could begin to be analyzed and interpreted. Connections between magnetic anomalies and sonar targets were made and smaller magnetic hits could then be examined as potential pieces of spent ordnance. A more detailed examination of the magnetometer and side scan sonar datasets will be discussed further in Chapter 5.

## Chapter 5

### “One of the Shortest and Most Brilliant Engagements of this Unfortunate Civil War”: The Battle of Elizabeth City and its Archaeological Evidence

#### Introduction

This chapter will explore both historical and archaeological data collected throughout the study. A detailed historical narrative of the battle, formed completely from primary sources that guided the formation of the GIS model from Chapter Four will be examined first. This detailed narrative will be the most comprehensive narrative of the battle yet written. Following this narrative, the chapter will focus on the archaeological data from the limited remote sensing survey conducted on site. The magnetometer data will be examined first, followed by the side scan sonar data. These two datasets will then be analyzed simultaneously to determine relationships between magnetic anomalies and sonar targets. The collated data will then be used along with the theoretical framework described in Chapter Two to form interpretations in Chapter Six.

#### Detailed Narrative of the Battle of Elizabeth City

The Battle of Elizabeth City can be broken down into two distinct phases: preparations for the battle and the battle itself. The preparations by each belligerent will be discussed. When discussing the battle itself, the narrative will follow the actions in Fort Cobb before switching to the fleet-on-fleet engagement and finally the retreat of Confederate forces from Fort Cobb. While the narrative is as chronological as possible, there are times when it focuses on individual vessels.

#### *Preparations for the Battle*

On 7 February 1862, Colonel C. F. Henningsen was ordered by Brigadier General Henry Wise, commander of the ground forces at Roanoke Island, to do what he could for the defenses

of Elizabeth City, due to the advancing Union Fleet. Upon arriving in the town, he soon found Fort Cobb, a small four-gun battery situated on Cobb's Point, roughly two miles south of town. The four fort guns were 32-pound smoothbores. Henningsen found 28 rounds of ammunition along with the artillery (Henningsen 1862:191).

The fort was a sad affair. Henningsen noted that the magazine was dangerous and open to enemy fire. Parker noted that, while the guns were good quality, they were poorly mounted. Only one gun could be fired across the river. The rest were only able to fire south into the river's channel. The fort was less a fort and more a single wall protecting the four guns (Creecy 1901:222-223). Therefore, it was vulnerable to enfilading, or flanking, fire if the Union fleet were to pass the point. The engineer who designed the fort admitted that he thought Elizabeth City was the last place the Union would attack and therefore had not put much enthusiasm into the design. Parker notes that this is evidence that because of war's uncertainty, discipline is key to survival. To alleviate the problem concerning the vulnerable flanks and rear of the fort, Henningsen tried to obtain 150 slaves to help construct traverses. By 2 A.M. on 9 February, he had only been able to impress 30 men (Henningsen 1862:191; Parker 1883:234).

When Lynch and his steamers arrived on the morning of 8 February, they found that the Dismal Swamp Canal was closed and the locks in need of repair. He could have escaped to Norfolk via the Albemarle and Chesapeake Canal; however, his orders were to defend North Carolina's waters, and he intended on following them. He immediately sent men to attempt to repair the Dismal Swamp Canal and one of his officers, Captain Hunter, to Norfolk via carriage to obtain powder and ammunition, while sending *Raleigh* up the Albemarle and Chesapeake Canal to Norfolk to meet Captain Hunter. *Forrest* was taken immediately to the ways to undergo repairs to its propeller from damages sustained at Roanoke Island. The Mosquito Fleet sailors

could hear the artillery fire at Roanoke Island until it ceased around noon. Suspecting the island had fallen, Lynch appointed Lieutenant Parker to formulate a defense with Colonel Henningsen (Lynch 1862:595-596; Parker 1883:235).

One plan was to staff Fort Cobb with the crew saved from *Curlew*. Parker proposed bringing all the guns from the fleet to land and mounting equal numbers on both sides of the river. This included the four light field guns that Henningsen had. He argued that due to the light construction of the Federal steamers, the field pieces would be effective. Sailors acting as sharpshooters would also be armed with muskets along the riverbanks, which was only 200 yards wide. The problem was that this plan would take too much time. It was decided that *Black Warrior*, armed with two guns, would be anchored near the eastern bank, opposite and a little below Fort Cobb. Above the fort, the Mosquito Fleet would form line abreast to block the river. The crew of the *Curlew* was sent to repair the Dismal Swamp Canal. Henningsen's artillery would be kept in reserve (Parker 1883:235).

In the meantime, 200 pounds of powder and another 100 pounds of blasting powder had been procured and cartridges made up. Lynch loaded the powder and ammunition on *Sea Bird* and *Appomattox* and sailed south. The hope was to re-engage the Union fleet at Roanoke Island. On the way, they received news of the island's capitulation. Lynch continued on, hoping to rescue the soldiers from the Fort Forrest floating battery, but he stopped at the mouth of the Pasquotank River when the Federal steamers were sighted near sundown. Lynch escaped with both vessels back to Elizabeth City after the Federals gave chase, where the powder and ammunition was shared out between the Confederate ships (Henningsen 1862:191; Lynch 1862:595). His battle fleet now consisted of *Sea Bird*, *Ellis*, *Fanny*, *Appomattox*, *Beaufort*, and *Black Warrior*.

Immediately following the fall of Roanoke Island, Flag Officer Goldsborough ordered

Commander Rowan to take 14 steamers to destroy the rebel fleet at Elizabeth City. A secondary target for the Union force was to close the Albemarle and Chesapeake Canal (Goldsborough 1862:604-605). On the morning of 9 February, decks were cleared and the flotilla got underway. Before reaching the bar separating Albemarle and Croatan Sounds, the rebels remaining at their guns at Fort Forrest fired one or two shots. Boats from *Commodore Perry* were lowered, but the rebels abandoned the position before the boats reached shore. A schooner in good repair was taken and anchored in a nearby stream (Allen 1887:76).

The Union flotilla continued north through Albemarle Sound to the mouth of the Pasquotank River. In the late afternoon, *Sea Bird* and *Appomattox* were spotted and Commander Rowan signaled to give chase to the enemy steamers. *Delaware* and *Lockwood* both immediately started after the Confederates with the other vessels of the fleet steaming behind. The chase was abandoned at sundown and at 8 P.M., the fleet anchored 10 miles below Fort Cobb. Rowan then called all his officers aboard his flagship, *Delaware* (Quackenbush 1862:612; Rowan 1862b:607).

With his officers aboard, Rowan gave them his final orders and instructions. Before anchoring, they had come into contact with some men in a small boat. Those men gave Rowan much needed intelligence about the fort's construction and how vulnerable it was. Thus, Rowan explained to his officers that Lynch had two options: he could make an attempt to flee to Norfolk up the Dismal Swamp Canal (Rowan did not know it was closed) or he may have decided to face the Union fleet and drawn up his ships above Fort Cobb. The plan was to form a reconnaissance force that could quickly become an attack force if he deemed it prudent to attack. He reminded the officers that, with only 20 rounds per gun, they were short on ammunition and ordered them not to fire until the signal was given. In addition, to economize the ammunition they did have,

Rowan stated that if possible, to engage the Confederate steamers in hand-to-hand combat by boarding them. Finally, he ordered that *Underwriter*, *Commodore Perry*, *Morse*, *Delaware* would form the vanguard. The little *Ceres* would sail on their starboard flank, reconnoitering for shallow spots in the river. *Louisiana* and *Hetzel* would lead two columns behind the vanguard, while *Valley City* and *Whitehead* were ordered to break away after passing Fort Cobb and attack it from the rear. Rowan's fleet consisted of the vessels named above, plus *I. N. Seymour*, *Lockwood*, *Shawsheen*, and *Henry Brinker* (Figure 27) (Rowan 1862b:606-607). On the day of battle, Creecy (1901:222-223) mentions that the ships were sailing like a tight wedge. This suggests that they were sailing in an echelon formation as opposed to three columns in a line-ahead formation.

Following contemporary tactical thought, Flag Officer Lynch put his faith in Fort Cobb as his main defense. Together with the anchored *Black Warrior*, he hoped to catch the Union fleet in a crossfire well before they came to the Confederate line of battle. Rowan, on the other hand, planned to use his superior numbers and last minute dash to defeat the rebel fleet.

### *The Day of the Battle*

At 6:50 A.M. the order was given for the Union fleet to begin their advance up the river in the formation ordered by Rowan. About 8 A.M. they discovered the Confederate fleet drawn up between a quarter and half mile north of Fort Cobb. They were drawn up in a line abreast formation, with the right flank closest to Fort Cobb (Rowan 1862b:607; Traver 1880:28; Allen 1887:77). Midshipman Robert Camm's signal book recorded how the formation was arranged: "In a line abreast, [the] flagship [is] in the center. According to [the] seniority of their commanders, [ships are] on the starboard and port beam, reflecting the starboard taking precedence in all cases" (Camm 1862:73). It was naval tradition that officers of higher rank

would be found starboard of the commanding officer. In the case of the Confederate formation, *Sea Bird* would have been in the center, with *Beaufort* to its starboard and *Ellis* to its port. *Appomattox* was to the port of *Ellis* and *Fanny* to the starboard of *Beaufort* (Figure 28). *Black Warrior* was placed directly across the river from Fort Cobb (Parker 1883:25).

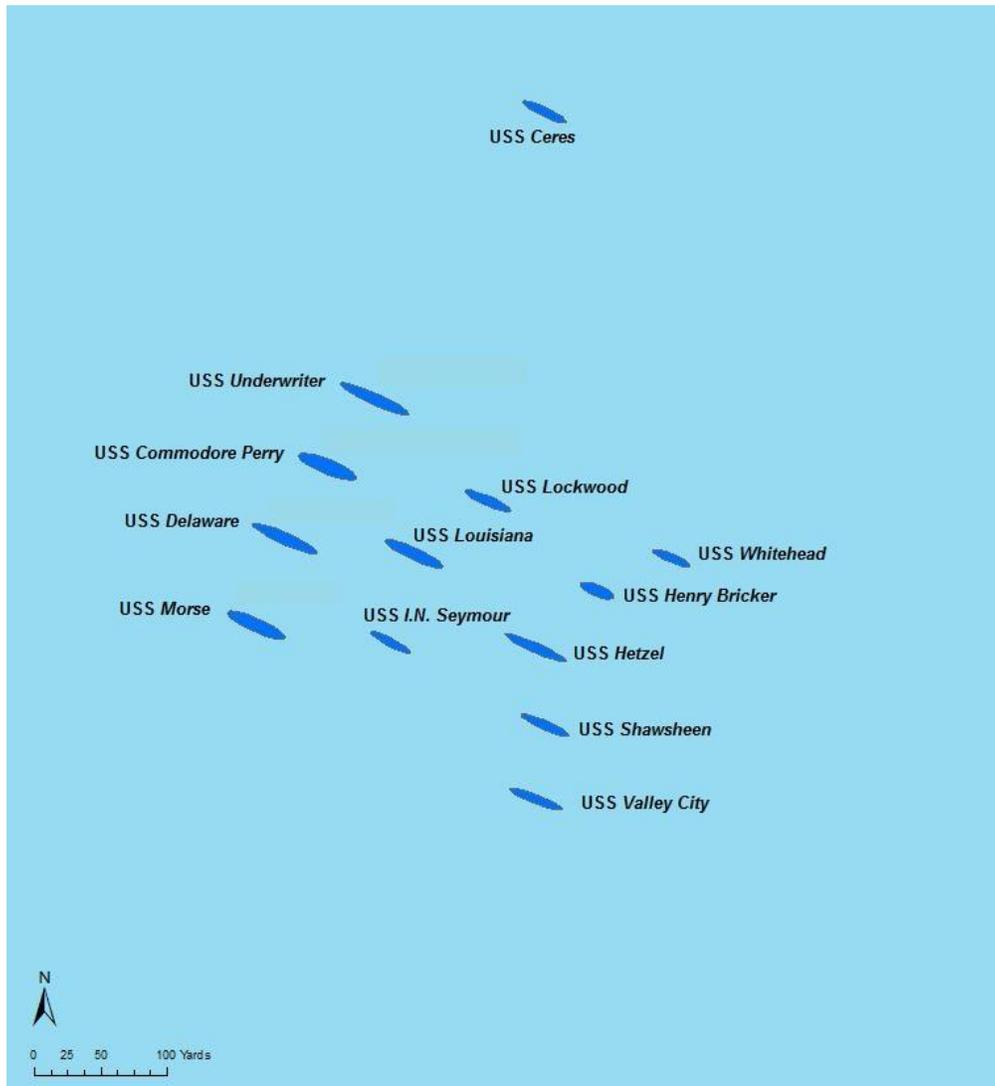


Figure 27: The Union Formation on the Day of Battle (By Adam Parker).

The sight of the Union fleet caused the militiamen who had been called up to duty the day before to flee from Fort Cobb. Lieutenant Parker states they all were gone before Lynch called upon him to bring his crew and ammunition to the fort, leaving behind only enough men to sail *Beaufort* away up the canal if they could. If the canal had not yet been repaired, Parker ordered

the pilot to set the ship ablaze to avoid having it fall into Union hands (Parker 1883:237). Lynch, on the other hand, states that the militia did not desert until the fighting happened. He wrote that, “We manned three of the guns with the aid of the militiamen, but they speedily deserted, and we fought with only two 32-pounders” (Lynch 1862:596). In either case, Parker was forced to abandon his command just as the Union fleet was coming within range of his guns to assist Lynch, who had chosen to defend Fort Cobb in person. After the militia deserted, some officers and crew from *Forrest* joined *Beaufort's* crew at Fort Cobb (Parker 1883:238).



Figure 28: The Confederate Line Abreast Formation (By Adam Parker).

When the Union fleet was within two miles of the Confederate position, the Confederate gunboats opened fire, using the maximum range of their guns (Figure 29). At 8:30 A.M., Fort Cobb began firing on the Union fleet (Woodward 1862:619). The Confederate fire fell “thick and fast among the vessels in the main columns” (or more accurately, ranks) (Rowan 1862b:607). This did not prevent the Union fleet from continuing forward at a moderate pace without firing.

The crews held fast, waiting for Rowan's orders. During this time, *Valley City* was struck by a shot from *Black Warrior*, destroying both of its longboats (Chaplin 1862b:614).



Figure 29: The Union Fleet Two Miles from Cobb's Point (By Adam Parker).

When Rowan's fleet was within three-quarters of a mile from the rebel line of battle, Rowan gave the signal, “Dash at the enemy!” (Figure 30). The signal was again given at 600 yards (Quackenbush 1862:612). At this time, roughly 8:45 A.M., the Union steamers quickened their advance to full speed. *Valley City* fired several brisk broadsides toward Fort Cobb from its port side while one rebel steamer and *Black Warrior* opened fire on its starboard. After a shell from Fort Cobb exploded near the ship's magazine, a gunner's mate, John Davis, covered an open barrel of powder with his body to prevent an explosion while continuing to pass powder to the guns (Chaplin 1862b:614-615). *Valley City* was the only vessel from the rearguard to open fire

when the orders were given, because the vanguard and second column were masking their fire (by being between them and the Confederate fleet) and the rearguard did not wish to damage any of the vanguard steamers with friendly fire (Davenport 1862b:610). The other rear guard members waited until they came abreast of Cobb's Point before they opened fire.



Figure 30: The Union Fleet's Position When They Opened Fire (By Adam Parker).

*Black Warrior* was soon dealt with by *Whitehead*. Acting Master French first began firing on one of the steamers when the order to go full steam at the enemy was signaled. *Lockwood* concentrated fire on *Black Warrior* (Figure 31). *Whitehead* began firing on the steamers before answering a shot from *Black Warrior*. French redirected his fire and sent a few shells at *Black Warrior* before closing in on the schooner. *Black Warrior*'s crew set fire to their vessel. At this point, *Lockwood* crossed the river, redirecting its fire toward *Fanny* while the sailors from *Whitehead* tried to extinguish the flames on *Black Warrior* (Figure 32). The fire was too far

advanced to put out and so French took six muskets, 12 boarding pikes, and the books and papers of the schooner's paymaster before scuttling it (French 1862:616-617; Graves 1862:618).

The Union vanguard saw much heavier action. *Underwriter's* Lieutenant Jeffers directed his pilot to bring the ship alongside *Sea Bird*. As they approached, he spotted two Confederate steamers, *Beaufort* and *Appomattox*, retreating toward the city (Jeffers 1862b:611). *Beaufort's* crew was now stationed at Fort Cobb and with only a skeleton crew aboard, the steamer had every reason to retreat for the canal. *Appomattox* kept up a brisk fire from its bow gun before the gun was accidentally spiked. Without his main armament, Lieutenant Simms began retreating to the canal as well, while still firing the howitzer he had on his stern (Parker 1883:239). Jeffers abandoned his pursuit of *Sea Bird* (Figure 32) and steamed past the Confederate line, returning the howitzer and musket fire from *Appomattox* with his 12-pounder rifled howitzer, assisted by *Shawsheen* (Figure 33). He did not hit either vessel's machinery and they soon passed a bend in the river north of town. Jeffers called off his chase of *Beaufort* and *Appomattox* once he reached Elizabeth City's docks (Jeffers 1862b:611; Woodward 1862:619).

*Sea Bird's* time as a Confederate ship remained limited, despite Jeffers not boarding it. Lieutenant Flusser, commanding *Commodore Perry*, wrote in his report to Rowan that he only fired on Fort Cobb and *Sea Bird*, and once past the battery, only on *Sea Bird* (Flusser 1862:613). Before the attack, Flusser warned that if any man cried for quarter, he would "shoot the coward himself". As he directed *Commodore Perry* directly at *Sea Bird*, *Fanny* passed. The sailors aboard the rebel steamer attempted to toss grappling hooks to board *Commodore Perry*, but they missed and drifted by but not before the soldiers aboard *Commodore Perry* fired a volley of buck and ball shot while sending a shell from their 100-pounder gun through its hull as well (Figures 31 and 34). Next *Ellis* attempted to grapple with *Commodore Perry*, but it too missed and drifted

past (Allen 1887:78-79).

*Commodore Perry* steamed on, still focused on *Sea Bird*. Flusser ordered the pilot to ram *Sea Bird's* broadside (Figure 32 and 35), then called for boarders and jumped to *Sea Bird's* deck with a brace of pistols, demanding a surrender. The boarding party behind him rushed over the rails with cutlasses, muskets, and pistols. The Confederate sailors were ready with cutlasses, axes, and boarding pikes. Only a few blows were traded, however, before Lieutenant McCarrick surrendered his sword (Allen 1887:79-80).

After *Lockwood* saw that *Black Warrior* had struck its colors, Master Graves crossed the river to attack *Fanny* while *Whitehead* closed in on *Black Warrior* (Figure 32). Graves ordered several stands of grape shot and musket fire at *Fanny* while the sailors on *Shawsheen* fired small arms as well. *Shawsheen* was about to board *Fanny* when Rowan called it off and *Shawsheen* joined *Underwriter* pursuing the retreating Confederate steamers. *Fanny*, in the meantime, was run aground intentionally and set ablaze after the shell from *Commodore Perry* started causing it to sink. Master Graves boarded *Fanny* and took from it 20 stands of arms and discovered that, like *Black Warrior*, the fire was too far advanced to extinguish. Lieutenant Quackenbush of the *Delaware* ordered a boat to go and capture the Confederate flag that still flew aboard the burning tug (Figure 36). The men returned to cheers from around the Union fleet (Graves 1862:618; Quackenbush 1862:612; Woodward 1862:618; Allen 1887:79).

Finally, *Ellis* was boarded by *Ceres'* sailors (Figures 32 and 37). Lieutenant Cooke of *Ellis*, realizing his command would be taken shortly into the hand-to-hand fight, gave the order to fire his vessel to prevent its capture. He also ordered the sailors to save themselves. They had grounded below Hospital Point while trying to turn and re-engage the Union vanguard. *Ceres* itself grounded when boarding *Ellis* (Hotchkiss 1862:620-621). The Confederate sailors jumped

overboard, then swam or waded to shore where several were wounded by small arms fire, including Midshipman Jackson, Cooke's second in command. Jackson was taken to USS *Hetzel* where he passed away 12 hours later from a pistol shot. *Ellis* was not set ablaze or blown up, however, as an African American coal heaver foiled the plans, allowing *Ceres* to capture *Ellis* (Cooke 1862:597; Davenport 1862b:611).

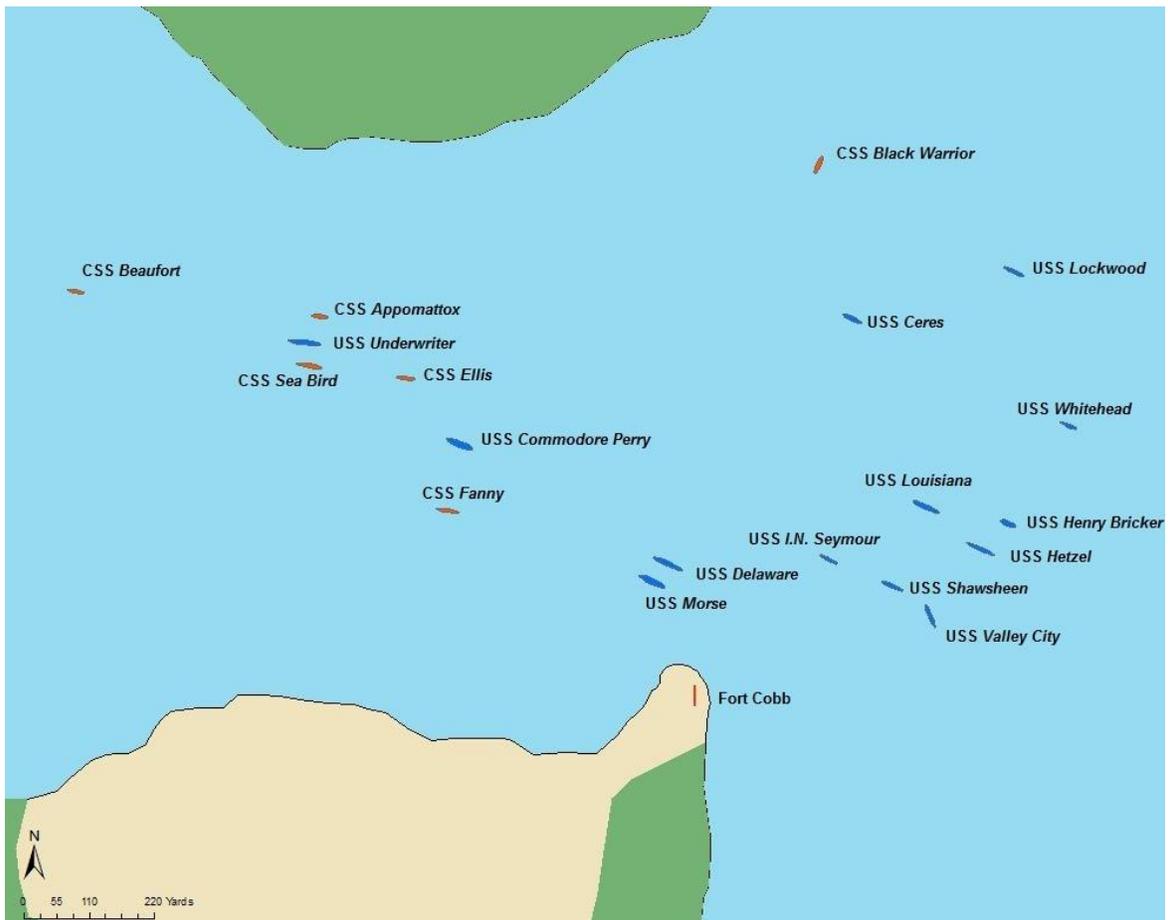


Figure 31: Close Quarters Action Begins (By Adam Parker)

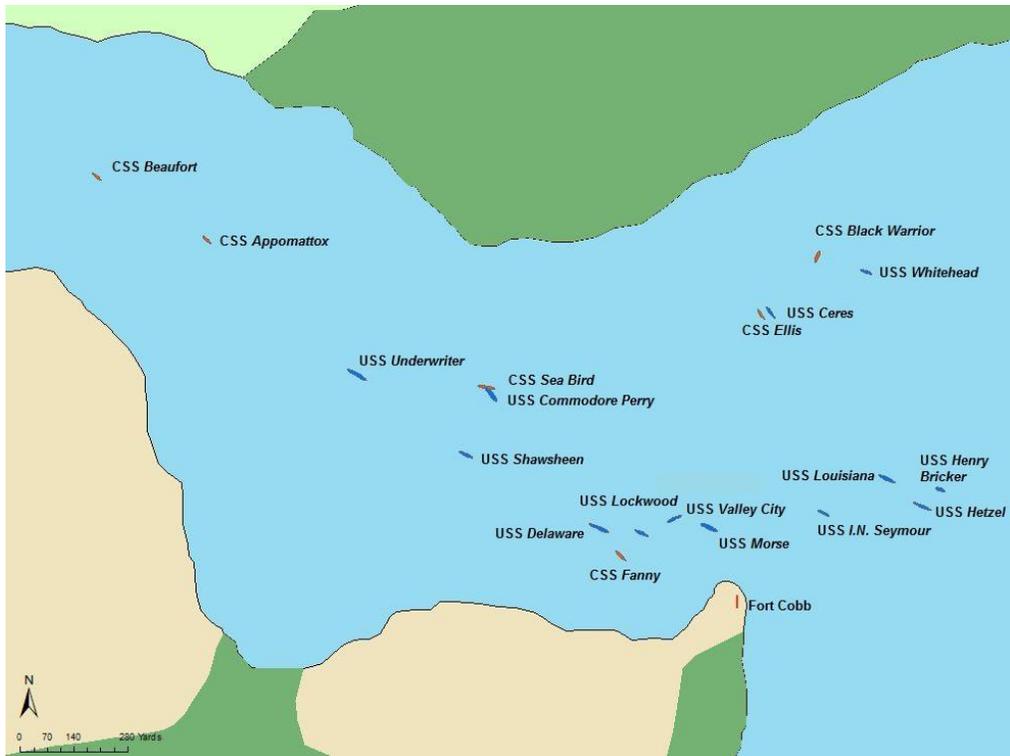


Figure 32: Close Quarters Action Continues (By Adam Parker)

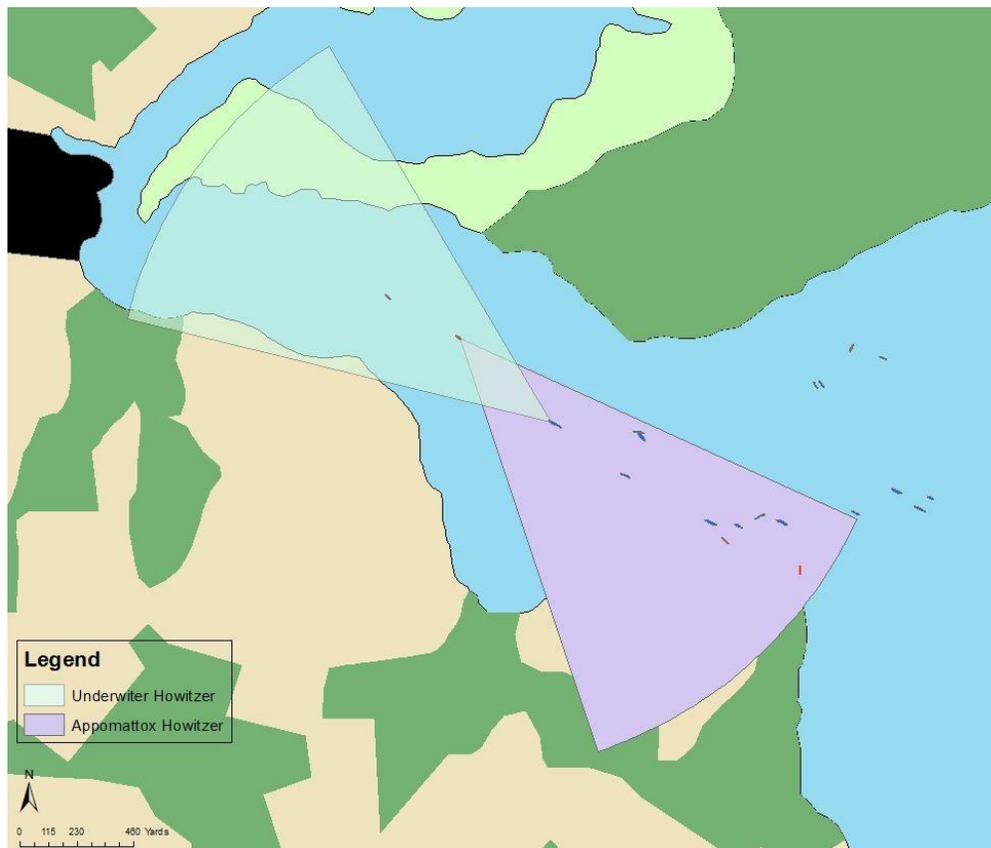


Figure 33: USS *Underwriter* and CSS *Appomattox* Exchange Howitzer Fire (By Adam Parker).

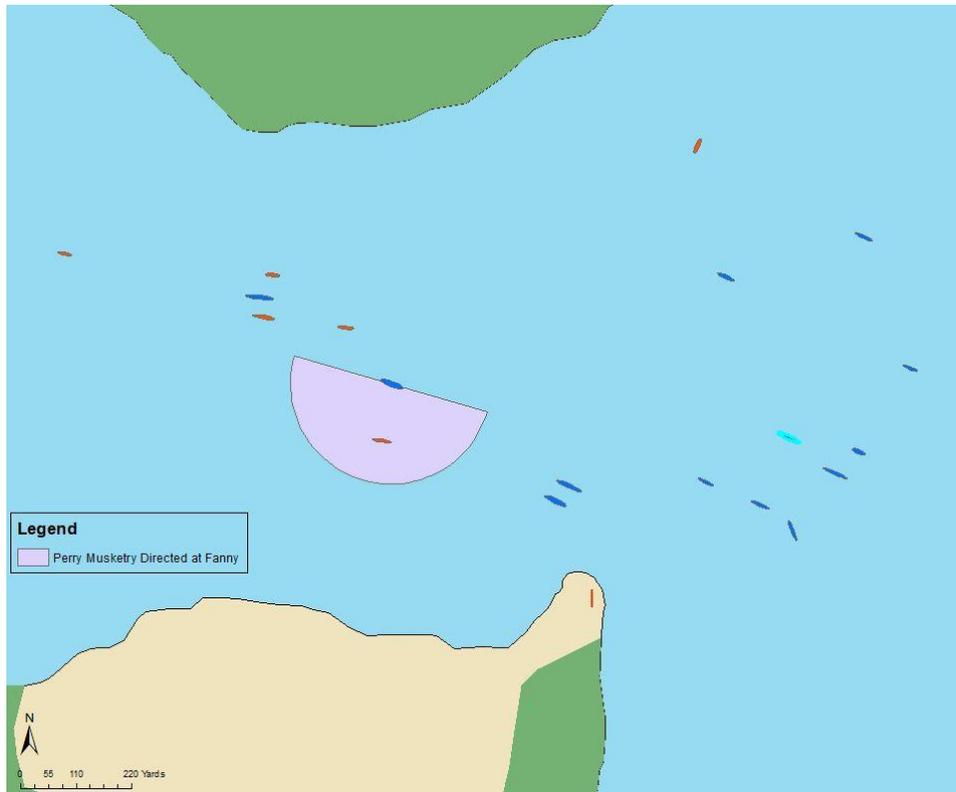


Figure 34: USS Commodore Perry Exchanges Musketry with CSS Fanny (By Adam Parker).



Figure 35: USS Commodore Perry Sinks CSS Sea Bird (Frank Leslie's Illustrated Newspaper 1862)



Figure 36: A Union Sailor's Sketch of CSS *Fanny's* colors being struck (New York Historical Society 1862)

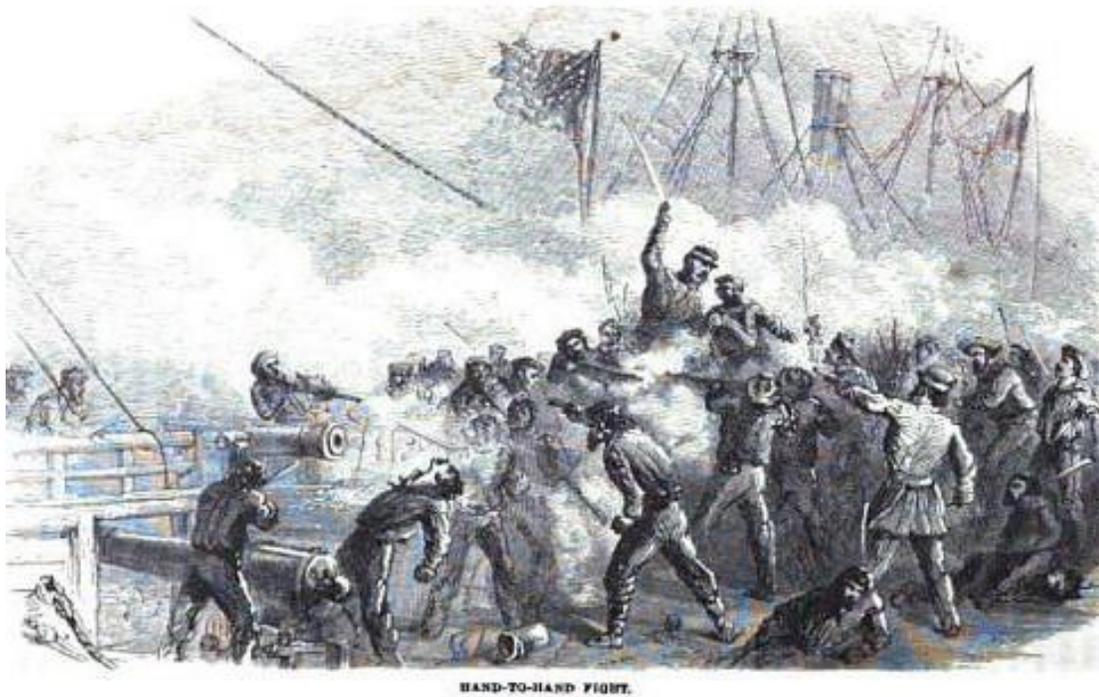


Figure 37: Hand-to-hand Combat as USS *Ceres* Boards CSS *Ellis* (Harper's Weekly 1862).

In Fort Cobb, Lynch, Henningsen, and Parker watched the tiny Confederate fleet get destroyed. A rider came up and informed Lynch about troops being landed a mile south of the fort. At this point, Henningsen fled to the town where he gathered what he could of his field artillery pieces and ordered a sergeant to burn the town. It is not clear what the rider saw because, although there was a regiment from the Fourth Rhode Island Volunteers aboard some vessels, Rowan's plan did not call for landing troops below the fort nor did Corporal Allen state that any troops from the Fourth Rhode Island were landed at all during the battle (Henninsen 1862:192; Lynch 1862:596; Rowan 1862b:607; Allen 1887:78-81). This seems to have been misinformation in the heat of battle.

The Federal steamers were in position to attack the rear of the fort and could kill everyone inside with only a few stands of grape shot. Parker ordered a retreat from Fort Cobb. The fourth gun that could fire across the river could no longer be brought to bear on the Union fleet. The Confederate forces spiked their guns, shouldered their arms, and lowered the flag above the battery before running for a patch of woods behind the fort. Parker nearly had to drag Lynch away as the latter watched his flagship sink (Parker 1883:240). By 9:25 A.M., the Battle of Elizabeth City was over and the Union controlled the river (Davenport 1862b:610).

Residents fled the town. The courthouse, two blocks of the downtown district, and several homes were burned. The Federals may have won the battle, but some Confederates refused to let them use the town as a base (Meekins 2007:29). Also burned were CSS *Forrest* on the ways undergoing repairs to its propeller, and an unnamed gunboat awaiting machinery (Rowan 1862b:608). The unnamed vessel that was burned may have been a 130-foot long gunboat the Confederate government ordered from ship builders Martin and Elliot (Holcombe 1997:45).

When the smoke cleared from the Pasquotank River, the Stars and Stripes flew over the

remains of Fort Cobb. *Black Warrior* and *Fanny* were set ablaze intentionally to prevent capture. *Ellis* had been captured. The sailors from *Curlew* who had been sent to work on the canal had indeed repaired the locks, which were operational for passage north. *Beaufort* was able to make it to Norfolk. *Appomattox* was not as lucky. At South Mills, it was discovered that the tug was too wide to fit in the locks. Lieutenant Simms ended up sailing *Appomattox* out of the canal and burning it (Meekins 2007:29). Finally, *Sea Bird*, Lynch's flagship, was rammed and nearly split in two. The crew had been captured and before long, the rebel fleet had burned or sunk (Allen 1887:80). In 15 minutes, the only fleet defending North Carolina's coast from the Federal Navy had been destroyed. Even more important was that the Union now controlled the most important river port in northeastern North Carolina. From this base, Rowan's fleet would be able to control Albemarle Sound without any naval resistance.

#### Archaeological Data

This section will focus on the data collected from the limited remote sensing survey conducted on 8 and 9 December 2014. This survey was conducted using both a magnetometer and side scan sonar. First, the magnetometer dataset will be examined followed by the side scan sonar dataset. After this, both datasets will be combined and discussed simultaneously in order to explore relationships between them.

#### *Magnetometer Data*

As discussed in Chapter 4, due to the self-funded nature of the survey, several compromises had to be mitigated regarding logistics for completing the survey. The most pertinent alteration came with the lane spacing. Ideally, the project would have taken place over the course of a week, with wider lane spacing used with the side scan sonar and tighter, narrower lane spacing for days with magnetometer. With wide lane spacing, once the magnetometer data is

interpolated, the subtle differences in small potential magnetic anomalies, or even the full magnetic field on an anomaly for that matter, are not distinct. Therefore, it was assumed early on that the magnetometer data would be distorted and steps were taken to offset those effects, such as pinpointing targets in the raw data files during the editing process and creating several different sorted files to be modeled. This is not to say that the data collected was “bad”; it is an acknowledgement to the limitations of the present study for the sake of transparency.

During the editing process, three criteria determined if a magnetic anomaly could represent a piece of spent ordnance: the total strength of the magnetic hit, the duration of the hit, and the location in the river. It was decided that due to the small size of a 32-pound round shot (6.4 inches) that a hit with 10 gammas or more for a duration of at least one half second would be considered a target. The *pBlock* models suggested that the lowest strength that a piece of spent ordnance might give off is a total field of 8.8 gammas (nT) when the piece was four meters below the surface; however, targets of 10 gammas or less were very hard to discern unless the data had a relatively low difference between the line’s minimum and maximum recorded data. Therefore, 10 gammas was determined to be the minimum for consideration as a target.

One last item to note is the types of magnetic poles considered targets. Due to the wide lane spacing, it was known that not every target would be presented as a dipole with both positive and negative fields recorded. Some targets may only reveal one half of their dipole as the towfish might pass over one side of the magnetic field whether positive or negative (Breiner 1973:18). Therefore, full dipoles were considered targets as well as poles that only revealed half the magnetic field so long as they fell within the above parameters.

By noting anomalies while editing the transect lines in *Hypack 2014*, 163 potential targets were identified that ranged from total strengths of 10.77 gammas to 2,651.49 gammas. To

separate which ones could have the potential of being pieces of spent ordnance, the 163 possibilities were then further segregated. The first group was composed of targets whose total strength fell within the *pBlock* models predicted strengths: 10 gammas to 75 gammas. The second group was made up anomalies whose strength fell between 76 gammas to 100 gammas. The purpose of this second cluster was to generate a group that may have been larger pieces of ordnance, such as a larger caliber shells or solid shot, that could not be modeled accurately with *pBlock*. A third grouping with magnetic strengths from 101 gammas to 999 gammas was split from a last grouping made up of targets with total strengths exceeding 1,000 gammas. The total makeup of the groups were as follows: 92 targets were within the 10-75 gamma group, 16 fell between 76-100 gammas, 48 measured between 101-999 gammas, and 7 were recorded at higher than 1,000 gammas (Figure 38).

The next step for processing the magnetometer data was to sort it. Because of the lane spacing, several radii measurements were used to sort the data: 5 meters, 10 meters, 20 meters, and 40 meters. Furthermore, each day was sorted separately and also combined with the other day's data. This sorted data was then imported into Geometric's *Magpick* software to be processed as a gridded model and contoured. The 12 sorted files were both gridded and contoured to determine which radius best represented the data. The gridded and contoured models of the magnetometer datasets are where the issue of the wide lane spacing came into play as the full magnetic field of each target could be shown. Therefore, these models need to be taken as what they are: sets of good data that were hindered by time and funding available and thus lack some of the finer details seen in fully funded magnetometer surveys.

Combining data from both survey days was useful in examining the total magnetometer coverage (Figure 39), however, the recorded 8 December 2014 data overshadows the 9

December 2014 data and hides many smaller targets that can be seen when looking at each day separately (Figures 40-42). Therefore, when examining targets identified after combining both magnetometer and side scan sonar datasets, they will be viewed with each day separated. Each file was exported as a GeoTiff image and then imported into ArcGIS as a raster image.

On the first day, 8 December 2014, weather conditions put the survey at the risk of being called off. Gale force wind were causing a small craft advisory at the mouth of the Pasquotank River. Conditions at Elizabeth City were unknown and so the team drove to the site where conditions were fair enough to conduct the survey. Toward midday, the winds picked up and created choppy surface conditions but not bad enough to cancel the survey. This is notable, because during the editing process, the survey conditions later in the day that caused the towfish to pitch in the water column may have caused “false targets” where the towfish recorded a disturbance in the earth's magnetic field when, in reality, it was pitching. Because targets were being identified by dipoles or if either of their magnetic poles showed, if the effect of the wave action on the towfish lasted longer than one-half second, it would have been identified as a target. This is another note made for the sake of transparency.

In the interpolated models 8 December, only the targets with the highest magnetic strength can be observed. Targets with strengths less than 100 gammas are not visible on either the gridded or contoured model. While the positions of the targets are known from the identification process during the editing phase, the interpolations are difficult to use for pinpointing targets. What can be seen is that many smaller targets that could potentially be spent ordnance are clustered at either end of the survey area (Figures 43 and 44). One cluster lies in a nearly straight line across the river while the other cluster has several within close proximity to each other.

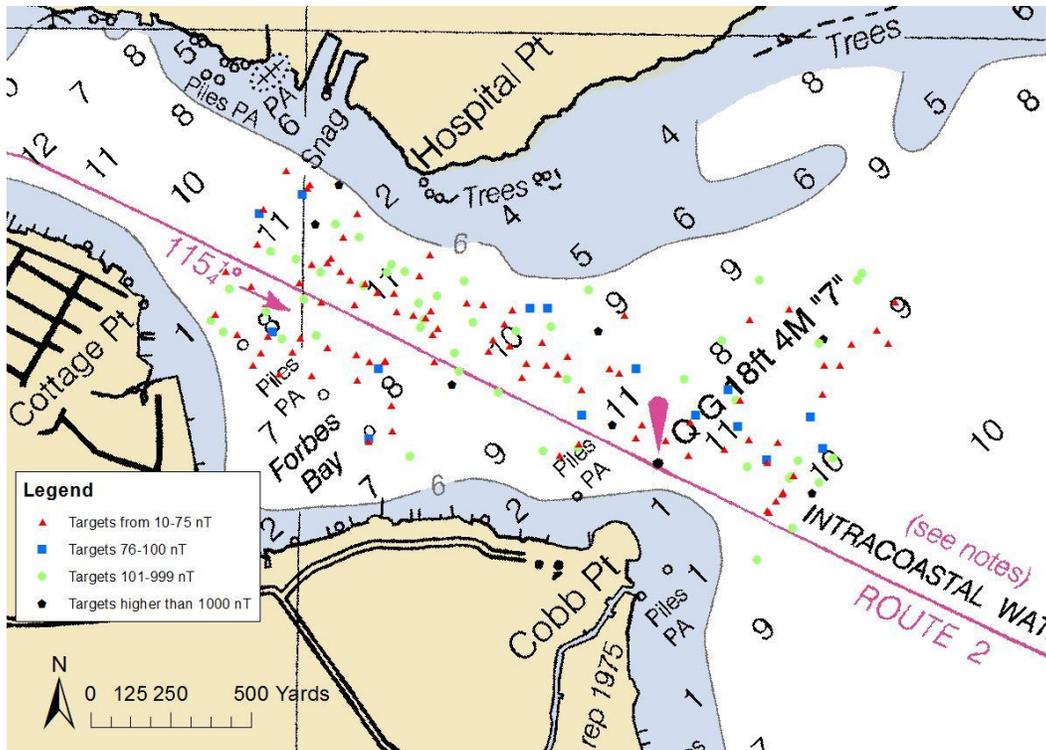


Figure 38: Magnetometer Targets Separated by Total Magnetic Strength (By Adam Parker).

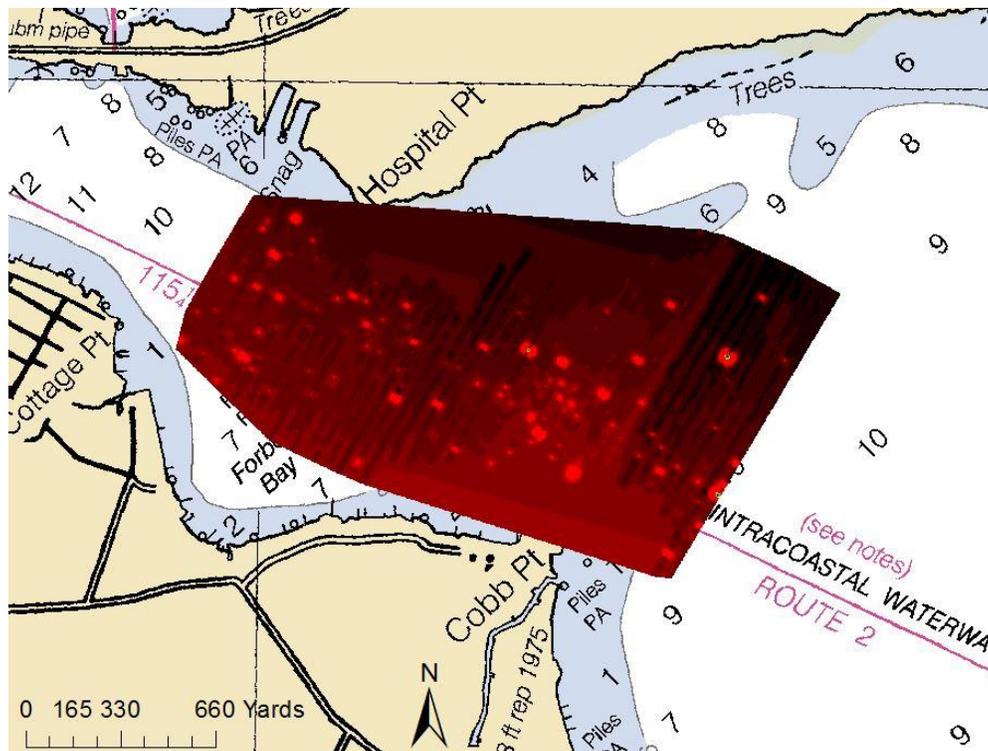


Figure 39: Total Magnetometer Coverage (By Adam Parker).

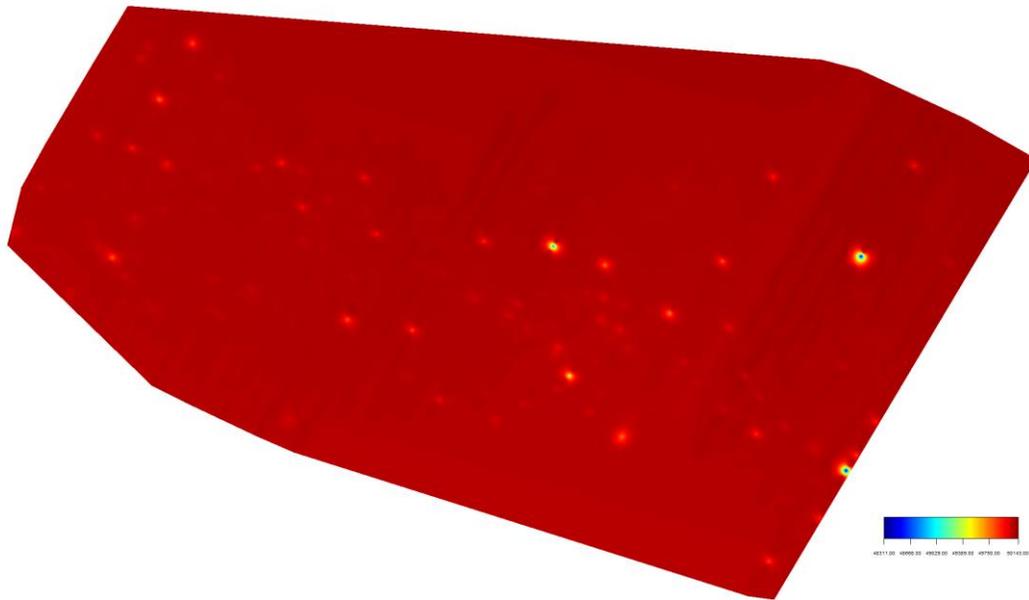


Figure 40: Magnetometer Data Modeled for Both Survey Days (By Adam Parker).

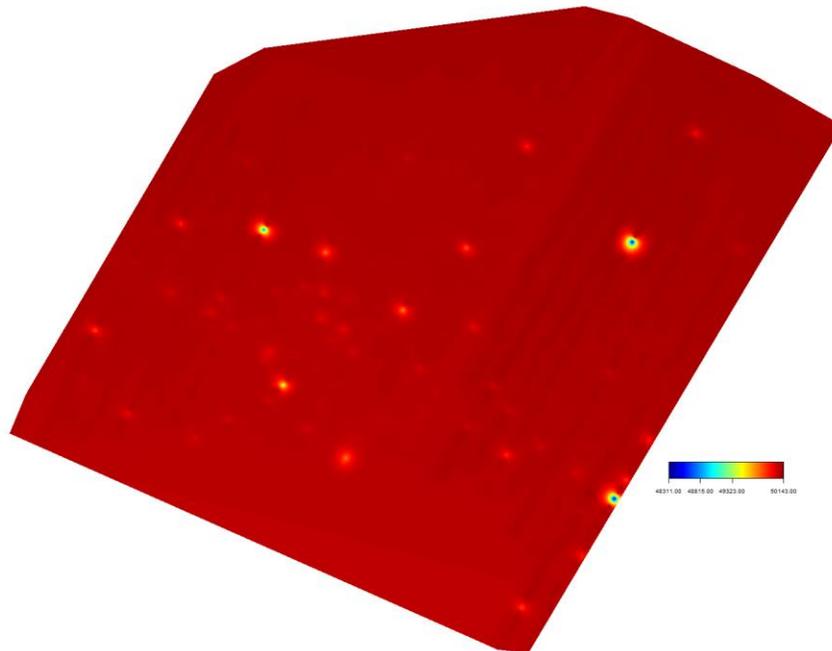


Figure 41: Detailed Magnetometer Data Modeled for 8 December 2014 (By Adam Parker).

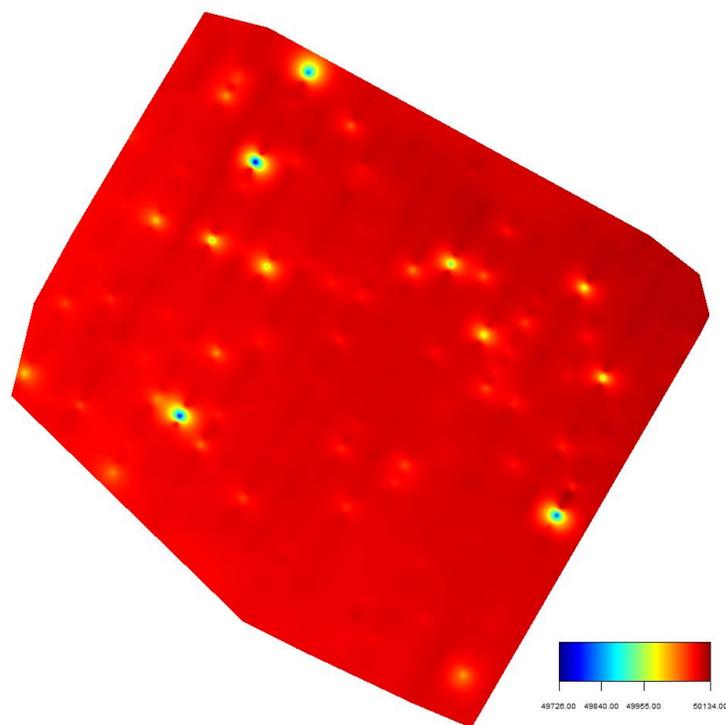


Figure 42: Detailed Magnetometer Data Model for 9 December 2014 (By Adam Parker).

On the 9 December 2014 imagery, many more smaller targets are visible. Wave action this day was minimal and thus, the chance of identifying a false target was lowered. Once again, targets with the highest magnetic strength show either both poles in the contour or else a large portion of their magnetic field. Many smaller targets are also visible and some were significant enough to be contoured in as well. While targets are spread throughout the survey area, there is a distinct clustering of various strength anomalies, especially smaller targets, further out in the river, than closer to shore (Figures 45 and 46).

#### *Side Scan Sonar Data*

The side scan sonar, unlike the magnetometer, did not require such tight lane spacing. As such, this dataset was not hindered in the collection process and allowed a large area of coverage (Figure 47). The purpose of the side scan sonar was not to locate the spent pieces of ordnance. They would have been too small and probably would have sunk into the layer of mud and

sediment on the river bottom (which is roughly 2 feet [.61 meters] deep by the author's estimation during earlier dives). Instead, the purpose of the side scan sonar was two-fold: as a check on the magnetometer dataset to eliminate different causes of magnetic anomalies such as abandoned crab pots and to relocate the remains of CSS *Sea Bird*, which had not yet been found.

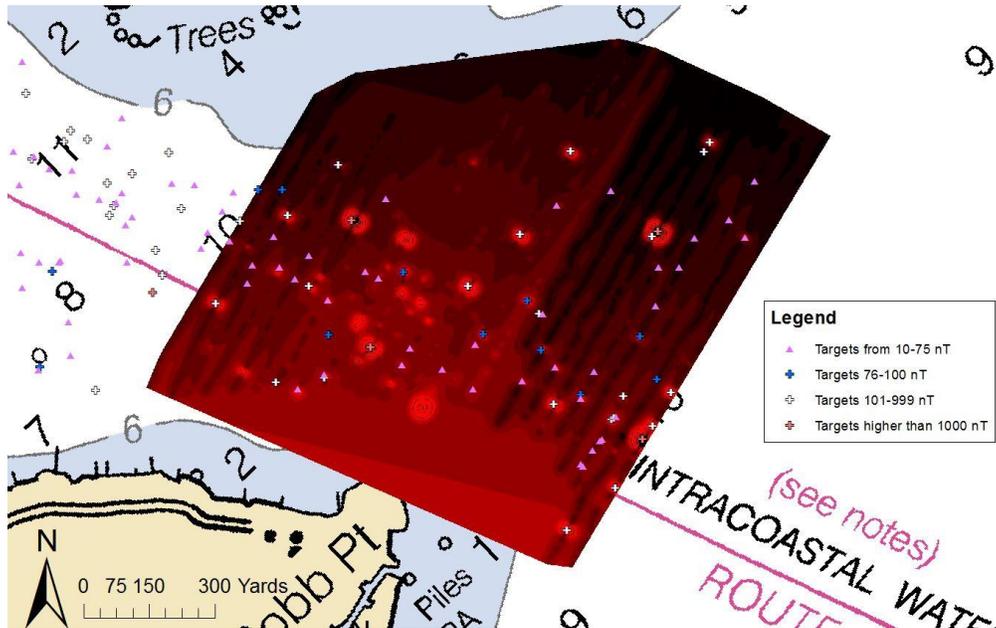


Figure 43: Digitized Magnetometer Targets Separated by Magnetic Strength for 8 December 2014 (By Adam Parker).

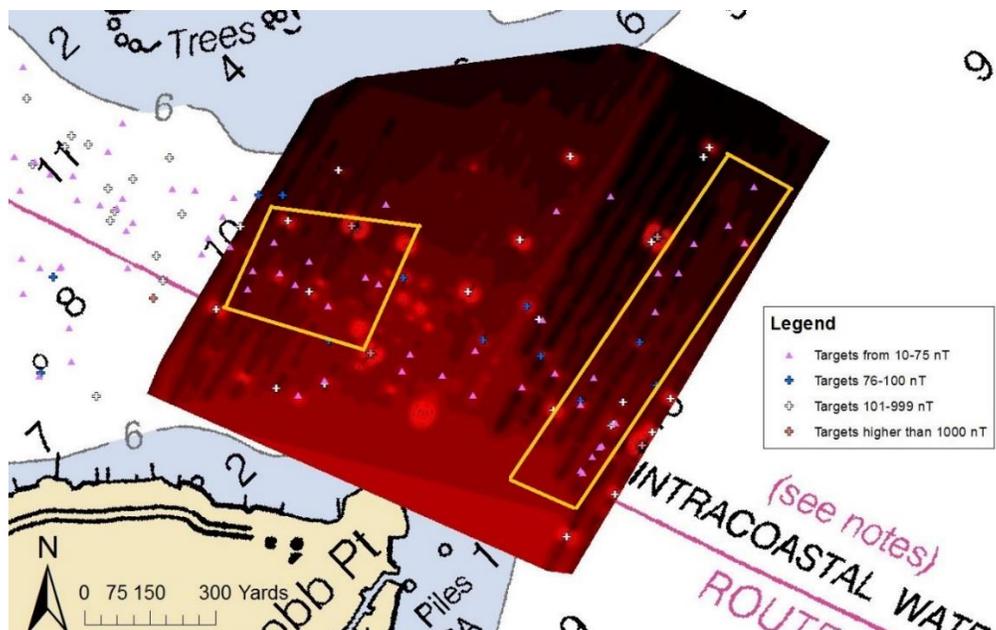


Figure 44: Magnetometer Target Clusters for 8 December 2014 (By Adam Parker)

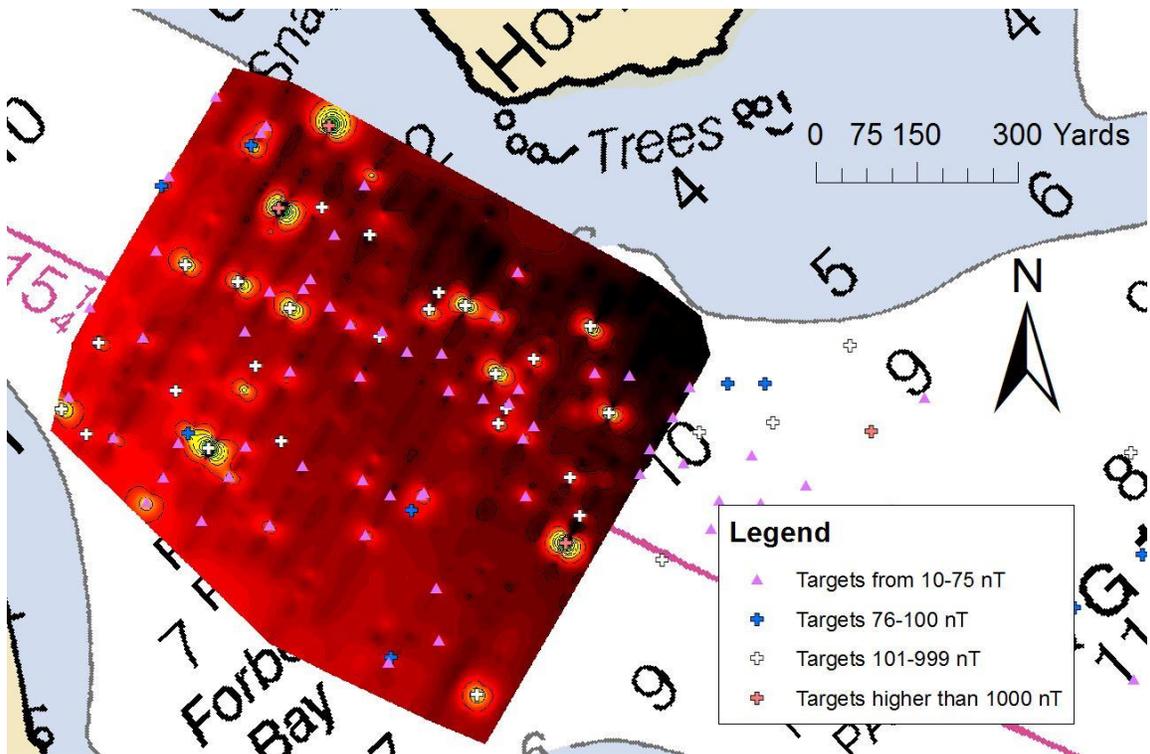


Figure 45: Digitized Magnetometer Targets Separated by Magnetic Strength for 9 December 2014 (By Adam Parker).

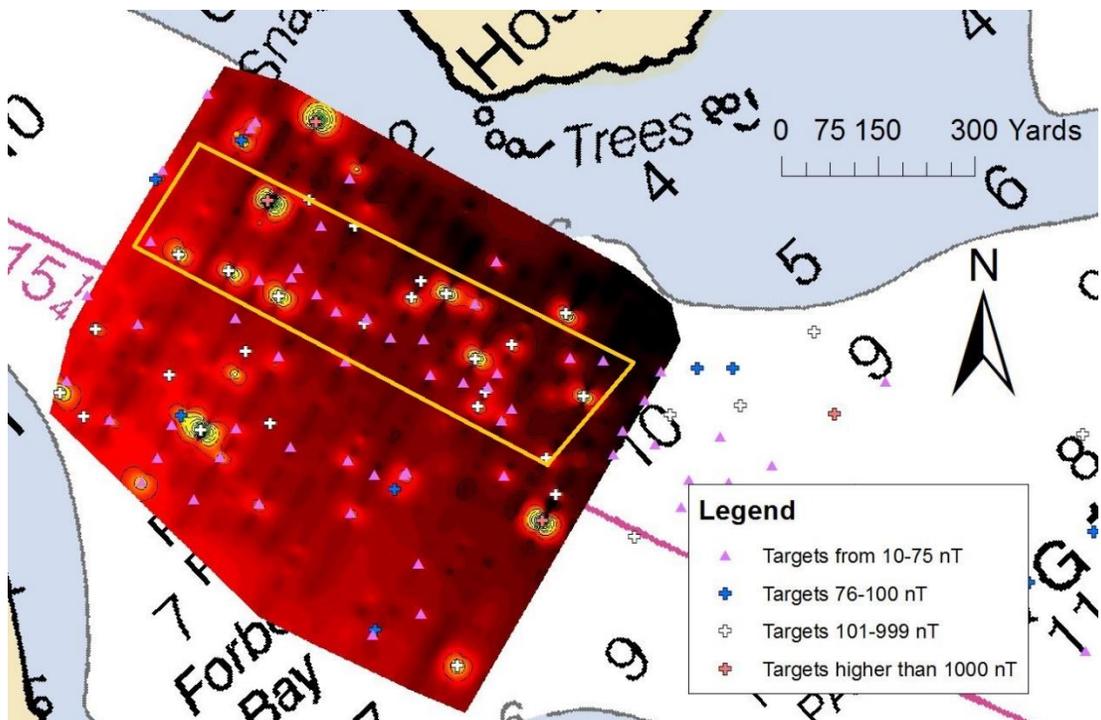


Figure 46: Magnetometer Target Cluster for 9 December 2014 (By Adam Parker).

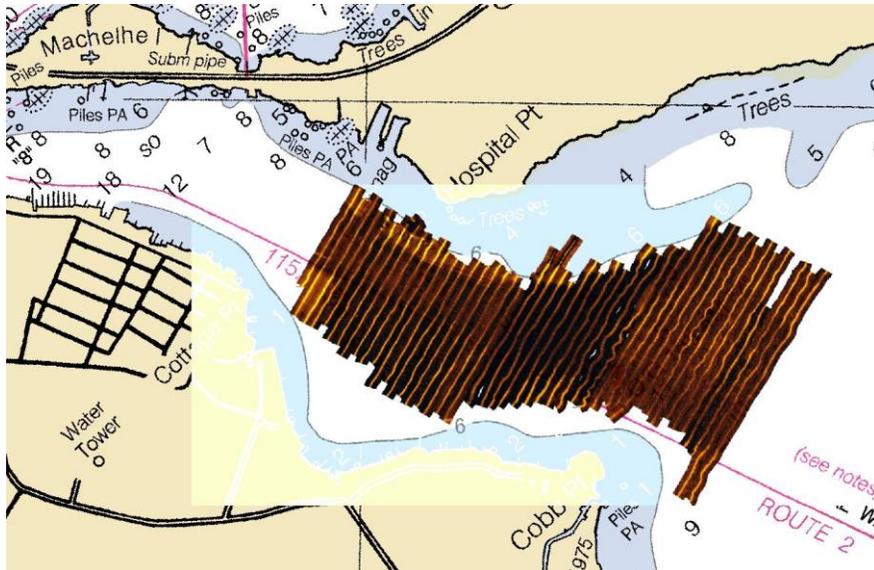


Figure 47: Total Side Scan Sonar Coverage Area (By Adam Parker).

The total area surveyed was 2.77 sq km. During the planning phase, lane coverage was set to 50 percent overlap. A large portion of the survey area falls within this percentage of overlap, and the coverage report from *SonarWiz5* shows that significant portions of the survey reached 100 percent overlap and even some at 200 percent. Lane coverage of 50 percent was 1.23 sq km, 100 percent was 1.27 sq km, and lane coverage of 200 percent was .27 sq km. Lane coverage above 200 percent account for only 182 sq m and this was only observed when turns were being made before data recording was suspended (Figure 48).

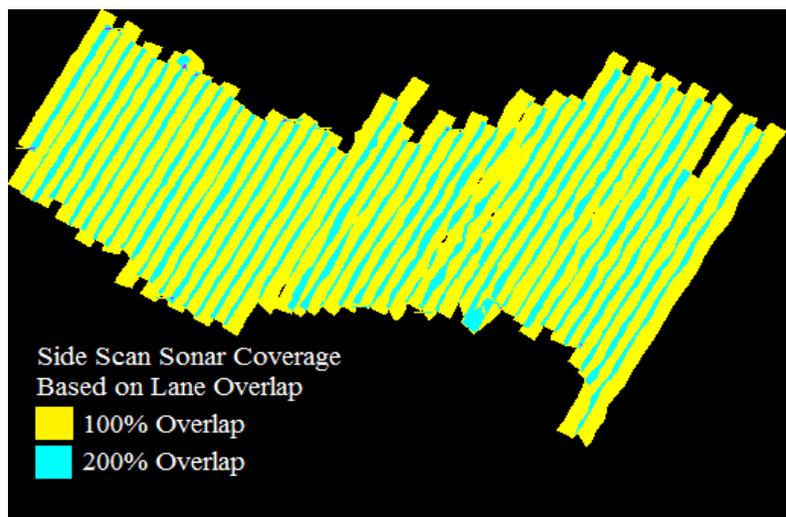


Figure 48: Side Scan Sonar Coverage Based on Lane Overlap (By Adam Parker).

Each side scan survey line was first manually bottom tracked, and then visually inspected for targets. (Figure 49). It must be noted that some targets may have been noted twice due to lay back differences between each lane. Thus each target was noted even if it was assumed that it was a duplicate. This did not happen often although it still must be noted. A total of 193 targets were documented. The dimensions of each target were then measured and the target assigned a classification. If an acoustic shadow was present, that too was measured to determine the feature's height above the river bottom. Finally, GeoTiff images were exported and then imported as raster information into ArcGIS.

The majority of targets were crab pots, pilings, or organic material such as branches, stumps and logs. There were some unknown features although none resembled a shipwreck. It is more than probable that *Sea Bird's* remains are buried completely in the layer of mud and sediment at the river bottom. Nevertheless, the side scan dataset remained important as a check on the magnetometer dataset.

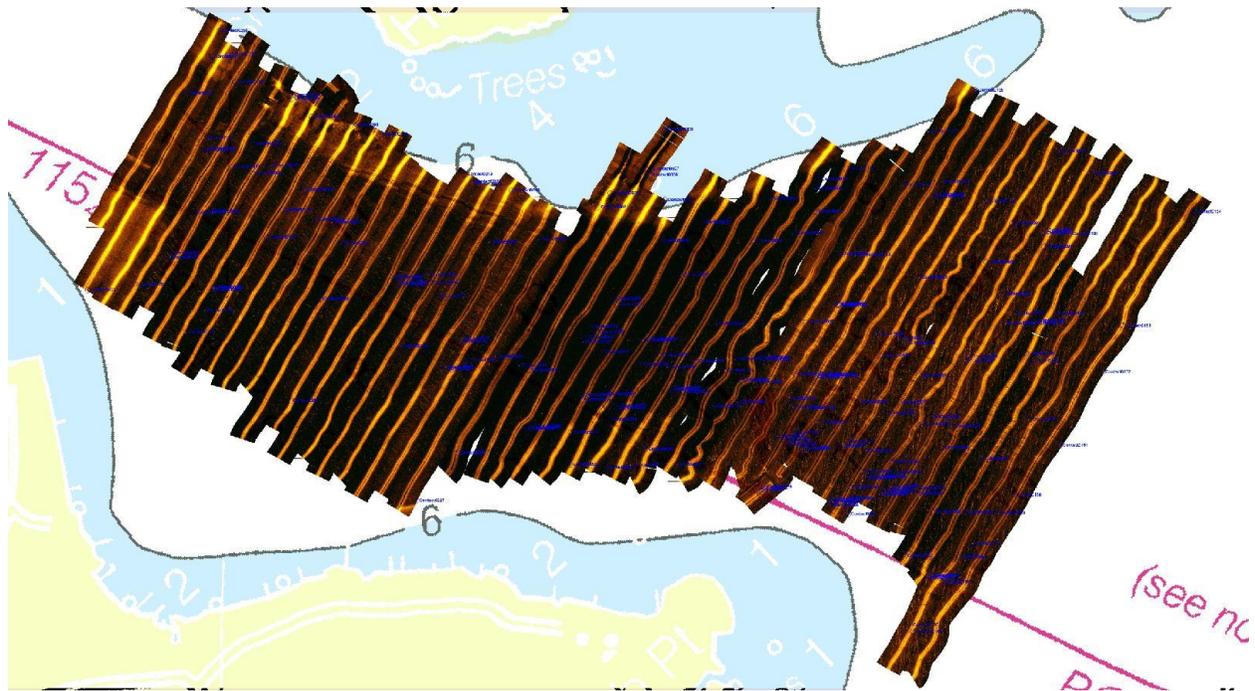


Figure 49: Identified Side Scan Sonar Targets (By Adam Parker).

### *The Combined Magnetometer and Side Scan Sonar Datasets*

By combining the datasets, a complete picture of the survey results becomes clear. The datasets complement each other and by using both, targets that have the potential to be spent artillery ammunition become visible. This in turn helps define the primary engagement zone for further analysis. Without diving on every target, a magnetometer target within the *pBlock* parameters can only be said to have the potential to be spent ordnance. Nonetheless, a final map showing all targets within the parameters and not associated with a target discovered in the side scan files will become the final product of the survey for use in the final analysis.

First, the contoured magnetometer models were imported to ArcGIS. The next step was to import the coverage maps of the side scan data. In this case, the GeoTiff image showing every side scan target was imported and set to 50 percent transparency to view the magnetometer models below (Figure 50). At first, due to the transparency, it was difficult to decipher how the side scan targets and magnetometer contours interacted with each other. Therefore, a point file was created and every sonar contact was represented in a format that was easier to visualize (Figure 51).

After this, the side scan coverage map was taken off and each day of magnetometer data examined separately (Figure 52 and 53). The final stage was to add the magnetometer target groups to the map in order to examine each interaction as completely as possible (Figures 54 and 55). In this fashion, those any magnetic anomalies associated with a sonar target could be eliminated from the final product. Once again, due to lay back differences between the two towfish, and fact that the magnetometer was towed and may have been pushed slightly off center by currents, some targets did not match up perfectly.

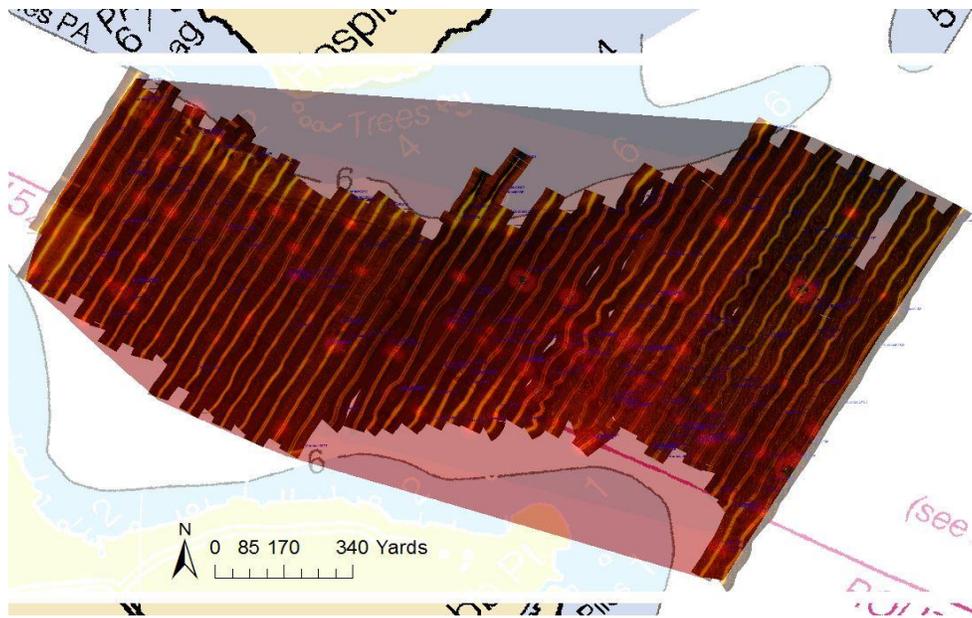


Figure 50: Side Scan Coverage Map With Identified Targets Overlaid Combined Magnetometer Data for Both Survey Days (By Adam Parker).

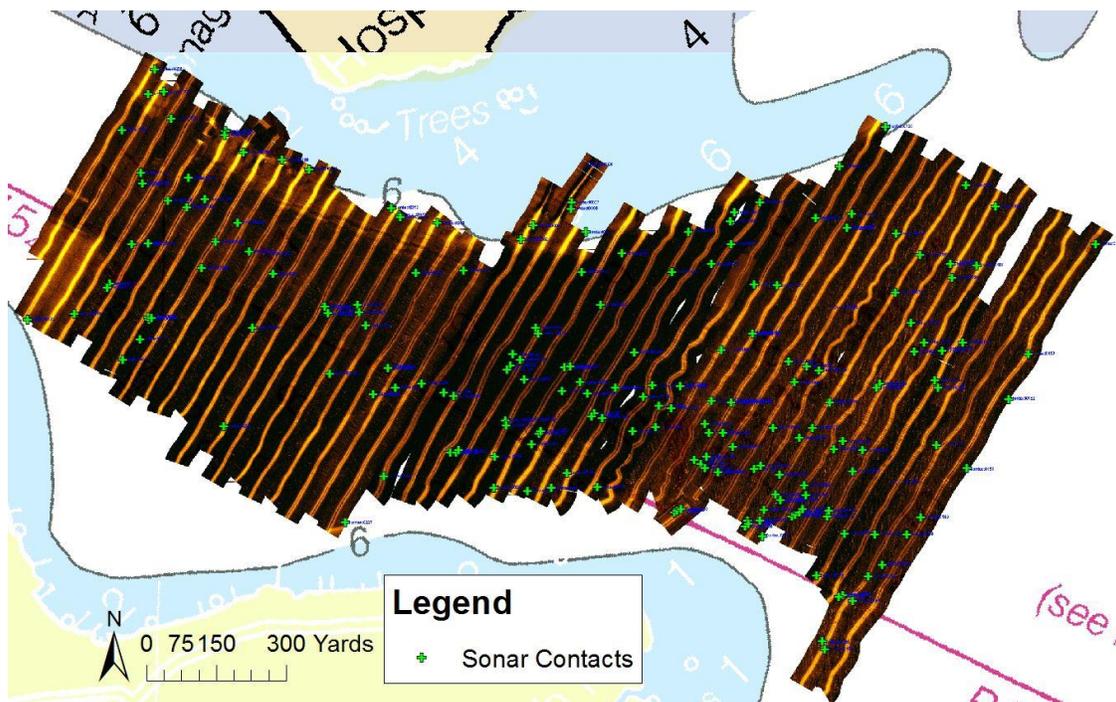


Figure 51: Digitized Points Showing Locations of Sonar Targets (By Adam Parker).

For the process of elimination, only targets that fell within the *pBlock* parameters were examined. The idea that the targets with strengths of 76-100 gammas was considered, to account for anomalies that may be associated with the battle and account for larger pieces of ordnance. In

the end, without knowing the probable magnetic signatures of the larger pieces, it was decided that there was no way of accurately knowing whether these targets could be associated with the battle and so they were left out.

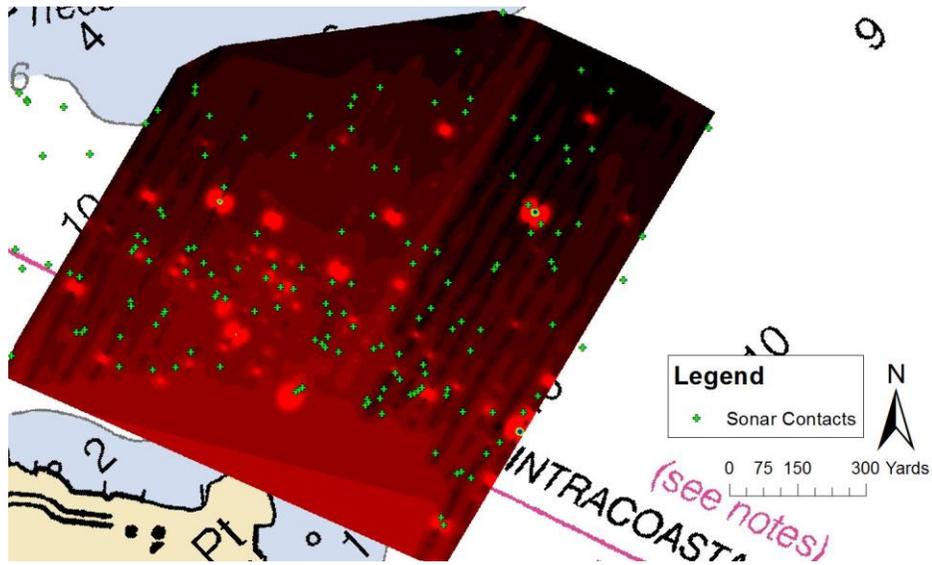


Figure 52: Sonar Targets Overlaid Magnetometer Contour Model for 8 December 2014 (By Adam Parker).

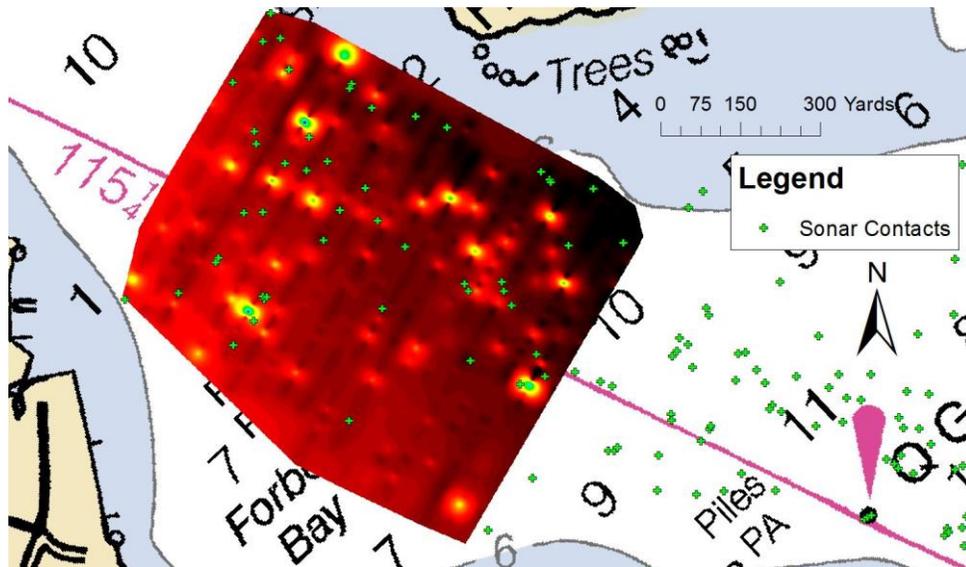


Figure 53: Sonar Targets Overlaid Magnetometer Contour Model for 9 December 2014 (By Adam Parker).

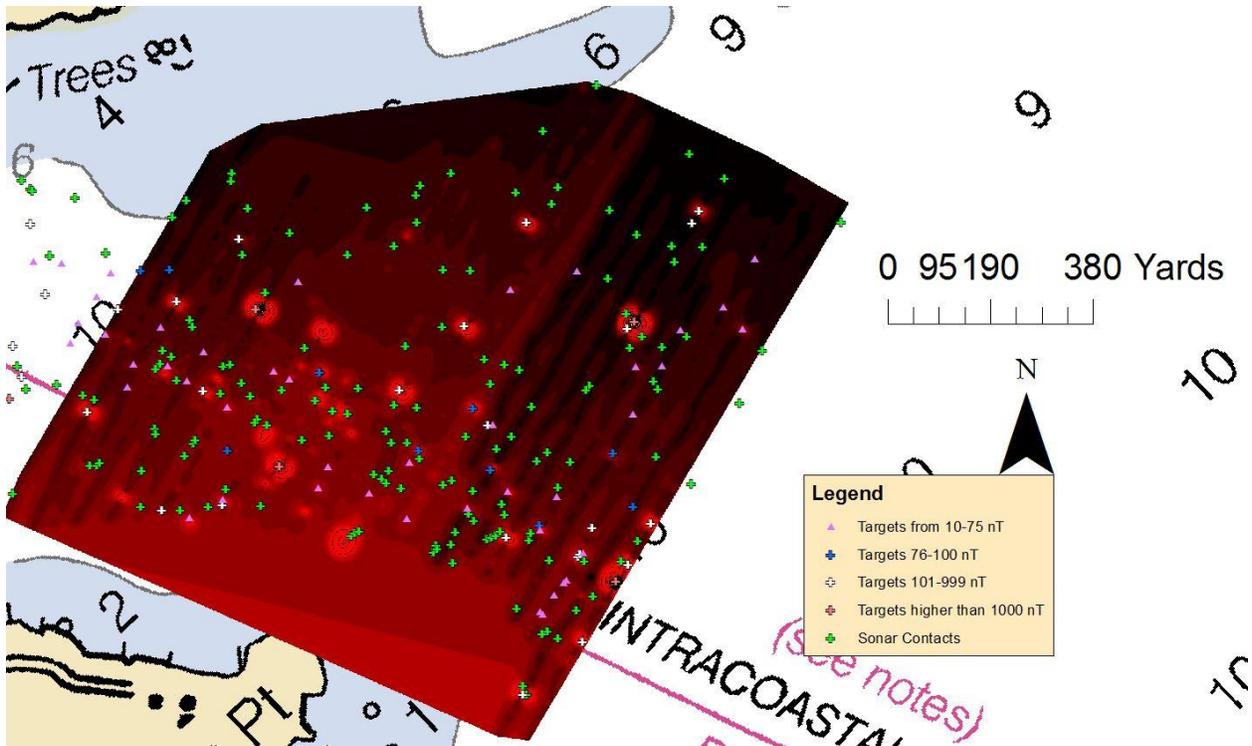


Figure 54: Sonar Targets with Magnetometer Target Groupings for 8 December 2014 (By Adam Parker).

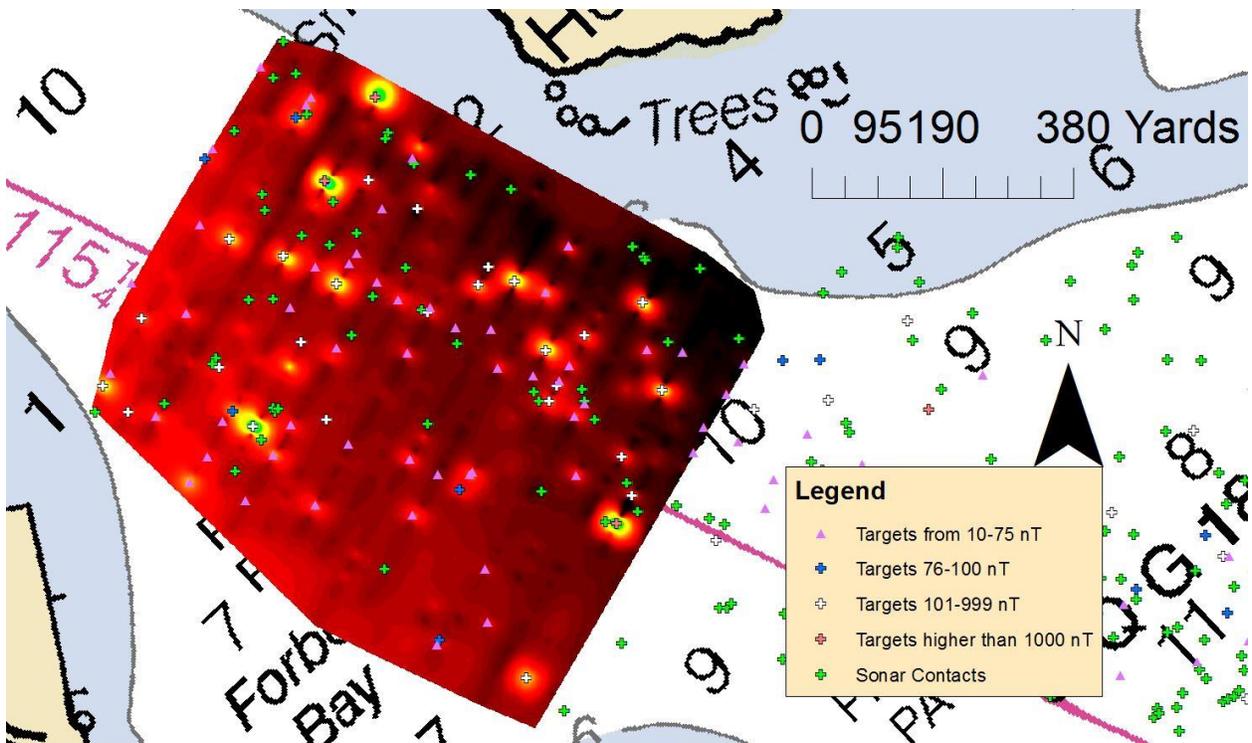


Figure 55: Sonar Targets with Magnetometer Target Groupings for 9 December 2014 (By Adam Parker).

For using the side scan sonar target positions to eliminate possible battlefield associated anomalies, a distance of 20 meters was used. If a sonar target and magnetometer target were within 20 meters of each other, the magnetometer target was eliminated from consideration because they were assumed to be the same object. In this sense, if the magnetometer towfish was being pushed off center by wave or current action, it would be known that the towfish was actually recording the edges of a sonar target's magnetic field. After the process of elimination, the remaining magnetometer targets were presumed associated with the Battle of Elizabeth City (Figure 56). This end product map will be one piece of evidence used in Chapter 6 to help analyze the battle for both KOCOA and MNTT frameworks.

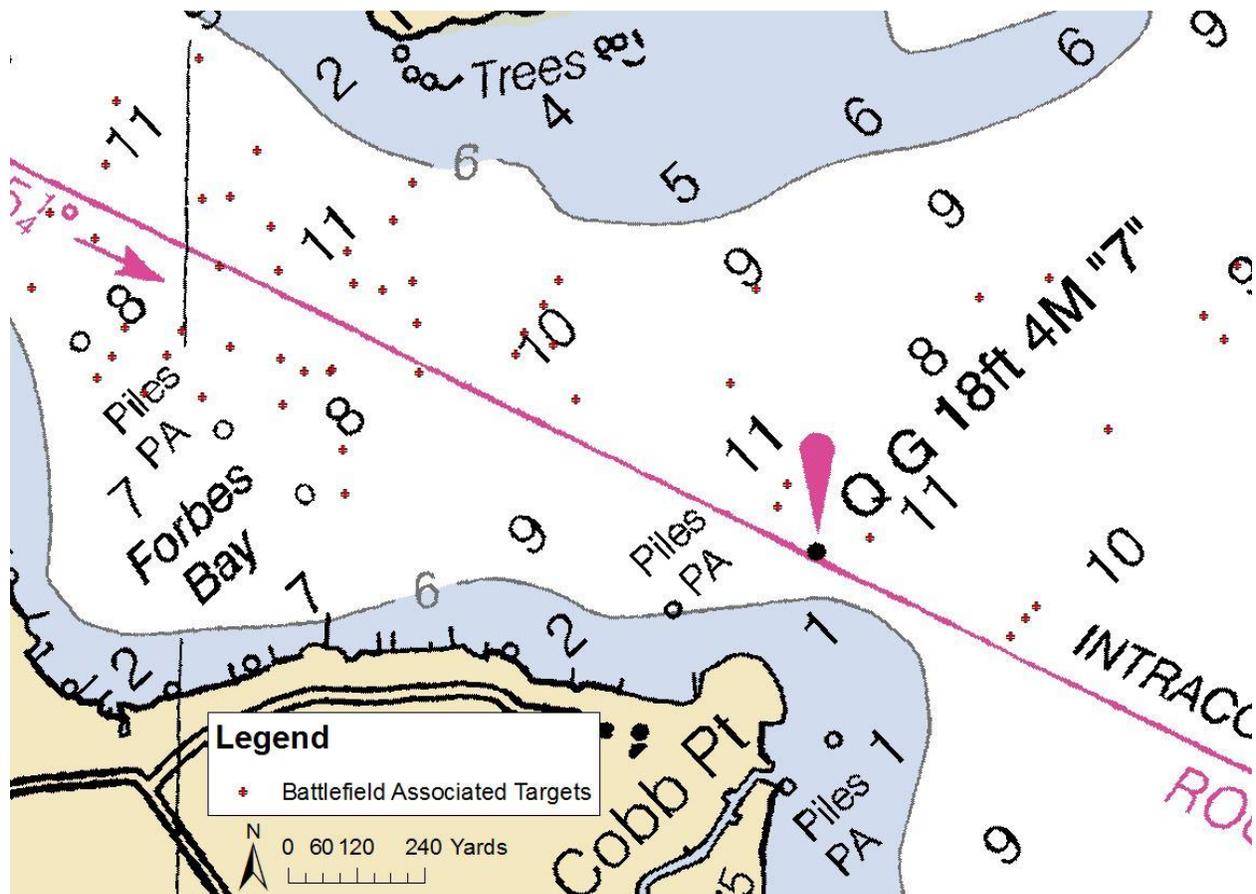


Figure 56: Positions of Potential Spent Ordnance Projectiles Associated with the Battle of Elizabeth City (By Adam Parker).

## Conclusion

In this chapter, three sources of data were examined: the historical data and both magnetometer and side scan survey data recorded in the field. The detailed historical narrative of the battle was used to create the GIS model discussed in Chapter 4. The same GIS model was then used to determine search areas for the remote sensing survey. The narrative presented here is the most complete account of the battle yet written. Finally, the magnetometer and side scan sonar data were examined individually before being combined in order to create a map showing the position of spent ordnance pieces. This map will help in the final analysis as it is a piece of evidence which helps define the primary battle space.

## Chapter 6 Analysis

### Introduction

The purpose of this chapter is to bring all of the datasets collected during historical research and archaeological survey together and analyze them according to the theoretical frameworks discussed in Chapter 2. From this combined data, new interpretations can then be made regarding tactics used in the battle. The chapter will begin by using the collated data and final map product from Chapter 5 to define the battlefield boundaries. After this, the METT-T, KOCOA, and MNTT analyses will be applied to both belligerent fleets and interpretations made as each element of the analyses is discussed. For the purpose of this examination, the METT-T analysis is most informed by the historical data, the KOCOA analysis by the GIS model, and the MNTT discussion by both historical and archaeological data sets and the GIS model. Finally, these analyses will be compared and contrasted with each other.

### The Battlefield Perimeter

Using the data compiled in Figure 56, the largest cluster of magnetometer targets potentially associated with the battle are found above Cobb's Point, in the area congruent with Union battle reports regarding the position of the Confederate formation. If they are, in fact, spent ordnance, they appear to represent Union artillery fire. The line of targets extending across the river on the survey's eastern edge, below Cobb's Point, would represent the last unified volleys of Confederate fire toward the advancing Union fleet. By this point, the Union vanguard and second column were advancing at full steam toward the Confederate position. This period would have been the time when *Beaufort* began retreating upriver to the Dismal Swamp Canal with its skeleton crew while *Fanny* and *Ellis* were beginning their advance to meet the Federal fleet (Parker 1883:237; Allen 1887:78-79) (Figure 57).

For the targets scattered in the zone between these two clusters, no definitive answer can be given as to who fired those projectiles. Parker (1883:239) remarks that *Appomattox* had kept a brisk rate of fire before accidentally spiking its bow gun, forcing its retreat and subsequent use of its stern howitzer during its retreat. He does not mention what else was happening at that moment during the battle. Therefore, *Appomattox* may well have fired a few shots at the Union vanguard as it advanced. These shots may have been fired by the Union in their first salvos. While Rowan (1862a:607) states that the Confederate fire was “thick and fast” but ultimately inaccurate, there is no mention in surviving accounts of the effect of the Union's accuracy. During the vanguard's first salvos, there is the possibility that they had not yet trained their guns effectively and some shots fell short of their intended rebel targets. These midrange targets could therefore be representative of both belligerent forces (Figure 57).

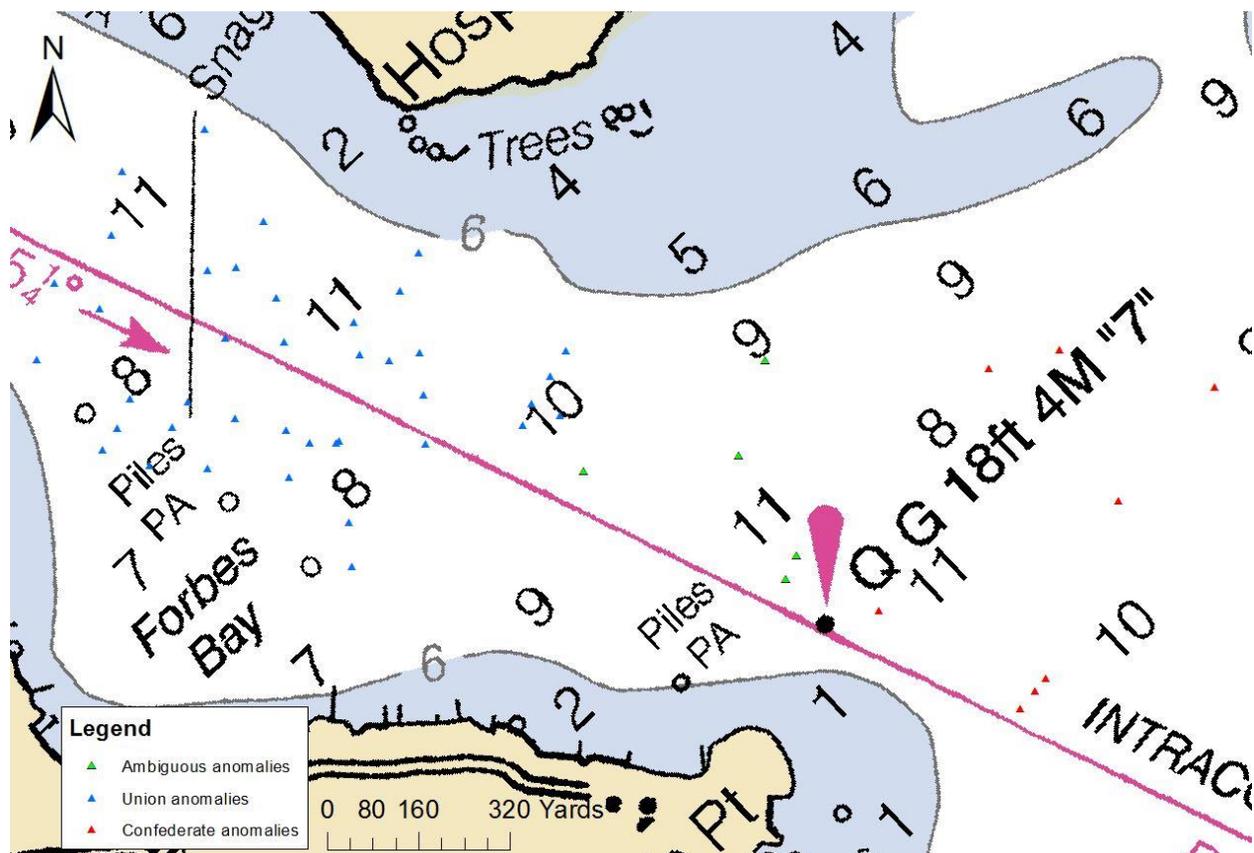


Figure 57: Ordnance Projectiles Potentially Associated with Each Fleet (By Adam Parker).

These data in effect create two kinds of engagement areas to examine: the study area and the core area. The study area consists of all places related or contributing to the battle event. This includes troop movements before, during, and after an engagement. This area begins when one force initiates the intention to engage in combat and ends when the opposing forces disengage from each other, including routes for advance or retreat. The core area is the battlefield section where direct combat occurred, the “hallowed ground” as it were. This core area is found within the boundaries of the study area (Lowe 2000:23-24).

Concerning the data collected in Elizabeth City, the study area would encompass Cobb's Point and the entirety of the river from where the Union first observed the Confederate battle formation. Because Rowan did not know if Lynch had retreated to Norfolk or decided to defend Elizabeth City, Rowan arranged the Union fleet in a reconnaissance formation that doubled as a battle formation if Lynch's fleet had taken a defensive position. What is not known is at what distance Rowan first sighted Lynch's fleet. The opposite end of the study area would stop at Elizabeth City, before the bend in the Pasquotank River around Machelles Island when *Underwriter* and *Shawsheen* disengaged from their pursuit of *Beaufort* and *Appomattox*. The advance and retreat routes would be mapped here, including the river channel leading from Albemarle Sound up the Pasquotank and the Dismal Swamp Canal respectively. The core area would begin two miles below Cobb's Point, the Union position when the Confederate forces first fired on them and initiated combat, and would end where the magnetometer targets extend closest to Elizabeth City. The main channel above the end of the survey zone should be included in the core area to represent the combat zone between the retreating Confederate steamers and pursuing Union vessels (Figure 58). With the battlefield now defined, the METT-T, KOCOA and MNTT analyses can be compiled.

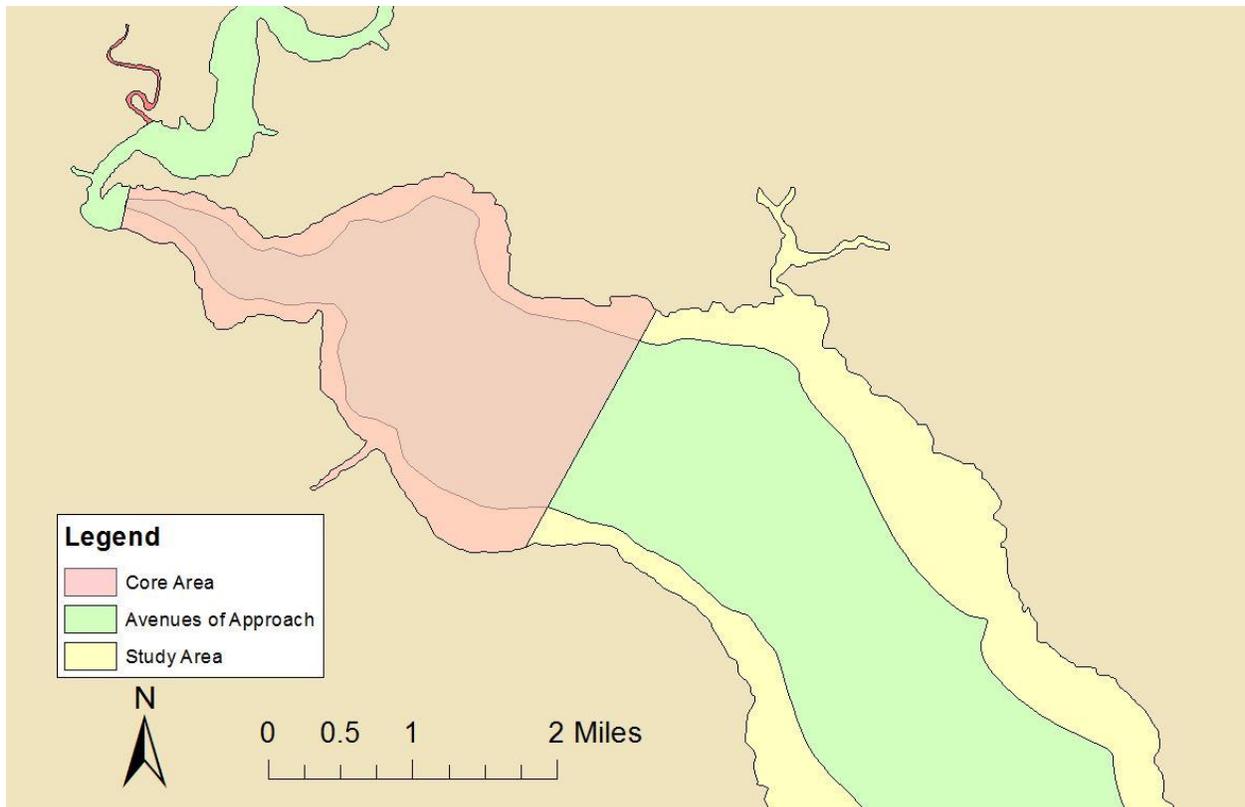


Figure 58: Battle of Elizabeth City Study and Core Areas (By Adam Parker).

### METT-T Analysis

METT-T is a theoretical framework for condensing and organizing a military commander's thoughts prior to an engagement. It addresses five points that are considered especially important: Mission, Enemy, Terrain, Troops Available, and Time Available (United States Army 1992: 2.8-2.9; Babits 2011:6). KOCOAs are a subset of METT-T and therefore, to begin looking at broad based anthropological questions concerning the archaeology of war, METT-T offers a more comprehensive look at an officer's thought process before a battle (Bright 2012:30). In this section, four key concepts composing METT-T will be examined for both Union and Confederate forces. Since the fifth concept, Terrain, is a subset within KOCOAs, it will be discussed in the next section as a separate analysis, but it still remains an integral part of METT-T.

### *Mission*

Mission is defined as the leader considering the mission given to the unit, contemplating its meaning two command levels higher, and deciding the essential tasks needed of the unit to achieve mission goals (United States Army 1992: 2.8). This definition will help guide the specific mission objectives for both forces. This not only helps analyze each commanding officer's actions, but also considers the overall larger strategic importance of official orders from either Lynch or Rowan's superiors.

### Confederate

The Confederate forces at Elizabeth City had a relatively straightforward mission: defend the city. In fact, Lynch was charged with the defense of the entire North Carolina coast. Though he was involved throughout the state in preparing coastal defenses, he wrote Secretary of Navy Stephen Mallory in September 1861, “But for the anticipated attack upon and the inexperience of the garrison of Fort Macon, I would have long since been at Roanoke Island which is the back door to Norfolk...” (Lynch 1861b:727). This would make it seem, that though he took his command of guarding the entirety of North Carolina's coast quite seriously, he paid particular attention to the defense of Roanoke Island and Albemarle Sound in an effort to protect the rear entrance to the more strategically important target of Norfolk. This why he would plan to re-engage the Union fleet at Roanoke Island on 8 February 1862 before learning of its surrender.

At that point, Lynch had only two options: retreat to Norfolk and resupply before returning to harass the Union fleet, or defend Elizabeth City with what resources he had. Had he retreated to Norfolk, he may have saved his vessels, but this meant that he would cede Albemarle Sound, Elizabeth City and control of both canals leading to Norfolk to the Union forces. At that point, they could have immediately tried to attack on Norfolk if the opportunity presented itself.

Alternatively, if he did retreat, he did not know what Union forces would remain in Elizabeth City and whether a Confederate force to retake the city would succeed by making an offensive through the Dismal Swamp Canal. Taking stock of his options, Lynch chose to obey his orders, defend the coast of North Carolina and Elizabeth City. After consultation with his officers, Lynch decided to use Fort Cobb as his main defense while the Mosquito Fleet would block the main river channel (Parker 1883:232, 235).

### Union

Commander Rowan's mission was more complicated. Rowan's official orders from Goldsborough were that he was to pursue and destroy the Confederate fleet with the secondary objective of closing the Albemarle and Chesapeake Canal (Goldsborough 1862:604-605). However, according to the concept Mission with METT-T, he needed to consider the objectives of the mission two command levels higher than his own. Goldsborough and Burnside were co-commanders of the expedition into North Carolina. Therefore, he had to think of the objectives one command level above them and consider the objectives set forth by McClellan. McClellan's stated that after Roanoke Island had been taken, the expedition's next objective was to seize control of Albemarle Sound (McClellan 1864:85-86).

To take control of Albemarle Sound, Rowan would need to occupy Elizabeth City, as it was the most strategic port on Albemarle Sound. From there, he could use the city as a base to launch further attacks and block the Albemarle and Chesapeake Canal. In order to do this, he had to destroy the Mosquito Fleet so that they could not harass his forces. Thus, Rowan's mission was to first destroy the rebel fleet, take Elizabeth City, and then simultaneously block the Albemarle and Chesapeake Canal and pacify the rest of the Albemarle region. When deciding his battle plan, Rowan then made the decision to use his fleet to do a reconnaissance of Elizabeth

City first and attack the Mosquito Fleet if they had not retreated to Norfolk (Rowan 1862b:606-607).

### *Enemy*

The Enemy element is that a leader will “consider the type, size, organization, tactics, and equipment of the enemy expected to be encountered. The leader identifies the greatest weakness of the enemy and the greatest threat posed to his unit” (United States Army 1992: 2.8). Thus, the concept is predicated upon intelligence and how much had been gathered prior to an engagement. If one force's intelligence was superior to the other's, the former force would be able to make more efficient decisions early on in the engagement and gain an upper hand while the latter force would be making decisions in real time to account for their lack of intelligence.

### Confederate

The Mosquito Fleet had ample time to observe and gain intelligence about the Union flotilla during the Battle of Roanoke Island on 7 February 1862. Parker (1883:236) stated that the rebel forces knew Rowan had 14 steamers mounting 33 guns compared to the six vessels with eight guns the Confederacy had after their retreat. Thus, Lynch knew he was at a numerical disadvantage and that Commander Rowan was a dashing officer, in the sense that he preferred aggressive maneuvers and tactics when engaging an enemy and thus they knew what tactics he was likely to employ. Even with this knowledge, Lynch expected Rowan to bombard Fort Cobb first as he had done at Roanoke Island before turning his sights on the rebel fleet. There were two unknowns to Lynch: how much ammunition Rowan would have to make his assault and the state of his steamers. At the Battle of Roanoke Island, some Union vessels took damage such as *Louisiana*, set afire for a short time by a shell and *Hetzel*, whose 80-pounder aft gun exploded, blasting a hole in the deck (Murray 1862c:557; Davenport 1862a:559). None of the damage

seems to have affected the performance of the steamers at Elizabeth City; nonetheless, it remains that Lynch did not know the exact condition of the Union fleet as it steamed up the Pasquotank River.

### Union

Much like the Confederates, the Federals were also able to gather intelligence about their enemy during the Battle of Roanoke Island. Rowan would have known the size of the Mosquito Fleet, but he would not have known that *Raleigh* was sent to Norfolk or that *Forrest* was on the ways for repair. He would have known approximately how many guns they mounted as well. There is no mention in the documentary record that he knew of Lynch's tactical preferences. As for defending the city, he knew from men they interrogated on 9 February that Fort Cobb was vulnerable. At the same time, he did not know if any extra defensive measures had been taken by Lynch, such as Parker's suggestion to remove all cannon from the ships and place them on the riverbanks (Rowan 1862b:606-607; Parker 1883:235). He did not know the state of Lynch's ammunition supply either. It would be a fair assumption for him to make that Lynch would have been able to procure powder and shot from Elizabeth City, which may be why he cautioned his officers to save their ammunition until he gave his orders to dash on the enemy.

### *Terrain*

As stated above, the concept of Terrain is further subdivided to the elements that make up the KOCOA framework and will thus be discussed in the following section.

### *Troops Available*

Troops Available is a way for unit leaders to look at what resources they have available to them, considering the strength of subordinate units, the characteristics of available weapons, and the capabilities of attached elements as they assign tasks to subordinate units (United States

Army 1992:2.9). It is similar to examining the concept of Enemy; however, it is an introspective look at one's own forces instead of the enemy. The capabilities of a force determine how a commander will field each unit in an effective manner while taking into consideration what is known of the enemy's forces. In the case of a naval battle, a commander may look at the ships and sailors aboard each as a single entity and that so long as each had enough sailors, it could continue fighting. Therefore, in this section, the ships will be examined as opposed to the number of sailors and soldiers unless necessarily noted by historical sources. The range capabilities of each piece of artillery will be discussed further in the following section.

### Confederate

Lynch knew from the Battle of Roanoke Island that his fleet was outnumbered. The outcome of that battle left him even more at a disadvantage in the number of ships and amount of ammunition he had as well as the number of guns he could mount. *Curlew* had been lost at Roanoke Island and *Forrest* had been damaged too heavily to be able to continue fighting. Due to his desperate need for ammunition, he was forced to send *Raleigh* to Norfolk for supplies. This left him with six ships and their guns to defend Elizabeth City (Table 2).

*Black Warrior*, a sailing schooner, was the weakest link because it was dependent on winds and currents to make any movement. Therefore, Lynch's battle formation contained his steamers with mobility, while *Black Warrior* was anchored across the river from Fort Cobb. All vessels would have been in the middle of the river with enough water below the keel for draft not to be a major factor (*Sea Bird* having the deepest draft at 8 feet) unless they sailed too close to either river bank (Figure 20).

TABLE 2: Artillery and Draft of the Confederate Fleet (The Sun 1860b:3; Department of the Navy 1921n-s; Naval History and Heritage Command 2012a-f).

Vessel	Armament	Draft
<i>Sea Bird</i>	1x 30-pounder rifle 1x 32-pounder smoothbore	8'
<i>Beaufort</i>	1x 32-pounder smoothbore	6' 11"
<i>Ellis</i>	1x 32-pounder rifle 1x 12-pounder howitzer	6'
<i>Fanny</i>	1x 32-pounder smoothbore 1x 8-pounder rifled howitzer	NA
<i>Appomattox</i>	1x 32-pounder smoothbore 1x 12-pounder howitzer	NA
<i>Black Warrior</i>	2x 32-pounder smoothbore	7'

Finally, Fort Cobb must be discussed, as Lynch had planned on making the fort the backbone of his defense. There were four 32-pounder guns in the fort. Three guns could only point down river while one was able to be pointed across the river, but not upriver of the fort (Parker 1883:237-238). The force Lynch had when the Union was first sighted were seven militia volunteers and one civilian. Upon sighting of the Union fleet, the militia deserted, forcing Lynch to call upon Parker's crew to work the fort guns, of which only two were used after the militia deserted (Lynch 1862:596). While Parker was the senior subordinate, Lynch took each ship's firepower into consideration, and *Beaufort*, with only one gun, was the weakest, making Parker's crew more valuable at the fort.

### Union

After the Battle of Roanoke Island, Rowan was ordered to take a fleet of 14 steamers to Elizabeth City. None of them had been seriously damaged during the battle and thus his fleet

remained at full strength. Upon embarking on the mission, *General Putnam* reported having engine problems (Hotchkiss 1862:620-621). It continued to steam behind the main fleet and was not a participant in the battle. Thus, Rowan's flotilla was reduced by one ship, but he knew he still held numerical superiority (Table 3).

TABLE 3: Armament and Draft of the Union Fleet (Department of the Navy 1921a-m).

Vessel	Armament	Draft
<i>Delaware</i>	1x 9 inch shell gun 1x 32-pounder smoothbore (57 cwt) 1x 12-pounder smoothbore howitzer	6'
<i>Morse</i>	2x 9 inch shell gun	8' 6"
<i>Commodore Perry</i>	2x 9 inch shell gun 2x 32-pounder smoothbore 1x 12-pounder smoothbore howitzer	10'
<i>Underwriter</i>	1x 8 inch shell gun 1x 80-pounder rifle	8'1"
<i>Ceres</i>	1x 30-pounder rifle 1x 32-pounder smoothbore (33 cwt)	6' 3"
<i>Louisiana</i>	1x 8 inch shell gun 1x 32-pounder smoothbore (33cwt) 1x 32-pounder smoothbore (57 cwt) 1x 12-pounder rifled howitzer	8' 6"
<i>I.N. Seymour</i>	1x 30-pounder rifle 1x 12-pounder rifled howitzer	6'
<i>Lockwood</i>	1x 80-pounder rifle 1x 12-pounder rifled howitzer 1x 12-pounder smoothbore howitzer	6' 6"
<i>Hetzel</i>	1x 9 inch shell gun	7' 6"
<i>Valley City</i>	4x 32-pounder smoothbore (42 cwt)	8' 4"
<i>Shawsheen</i>	2x 20-pounder rifle	7' 3"
<i>Henry Bricker</i>	1x 30-pounder rifle	6' 2"
<i>Whitehead</i>	1x 9 inch shell gun	8'

Rowan's fleet faced challenges with water depth. Without knowing the river extensively, Rowan knew his forces would need to stick to the main channel, as several had drafts deeper

than 8 feet. To reconnoiter shallow spots, Rowan chose *Ceres* to flank the fleet's starboard. While *I.N. Seymour* had a slightly lower draft than *Ceres*, Rowan was fond of using *Ceres* for reconnaissance since its arrival at Hatteras Inlet (Rowan 1861c:264-265).

Rowan placed his heaviest armed ships in the first two ranks (columns) of the formation. *Valley City* was heavily armed with four 32-pounder guns, but it was armed as traditional broadsides (Chaplin 1862b:614). It would be able to keep a broadside toward the rebel fleet while bombarding the fort once past Cobb's Point. As far as individual sailors and soldiers go, Rowan had full complements of men, plus a few companies of the Fourth Rhode Island Volunteers aboard some vessels (Allen 1887:78). However, since the mission was not to land troops, these soldiers can be described as more of a fighting force aboard the ships, allowing Rowan to generate more small arms fire on the Confederate fleet during boarding actions.

#### *Time Available*

Time Available is an examination of allotted time to complete the mission objectives, taking into consideration situations that arise during the engagement (United States Army 1992:2.9). This affects the overall pace of battle for each belligerent and how quickly objectives are pursued. Simonds (2014:132) states that time is not always an important factor, but is critical to examine in any situation regardless of its importance.

#### Confederate

The Confederate fleet did not operate under time constraints other than preparing to defend against the Union flotilla. Due to the nature of its defensive mission, all it had to do was hold out against the Union attack. Unlike Roanoke Island, there was a chance of resupply and reinforcements from Norfolk. This is especially true, as Confederate officers in Norfolk may have sensed the urgency of reinforcing Lynch due to the loss of Roanoke Island and potential

loss of Albemarle Sound as well.

### Union

Rowan did not know if reinforcements were going to come from Norfolk either. Therefore, the Union was operating under a heavier time constraint, as evidenced by the fact that Goldsborough sent Rowan north the day after Roanoke Island fell. The Federals needed to destroy the Confederate fleet before it had any chance to resupply or reinforcements came from Norfolk. Rowan recorded no allocations for time in his orders despite the fact that time of was the essence which may mean he did not think the engagement would be a long one (Rowan 1862b:606-607).

### *Weather*

Weather is a sixth and rarely discussed aspect of METT-T. It is the consideration of weather conditions before an engagement, with an officer trying to attack with optimal visibility and trafficability (United States Army 1992:2.9). In the case of the Battle of Elizabeth City, no reports of the weather that day were recorded. It can be posited that there was no wind that day because the powder smoke from artillery fire hung in the air, further masking the Union rearguard's fire (Davenport 1862b:610). As only officer reports survive and no ship's logs, this is the only observation that can be made on the morning's weather.

### KOCCOA Analysis

As stated above, KOCCOA is the breakdown of the Terrain element within METT-T. In an anthropological study, its inclusion within the METT-T frameworks gives a broader sense of how the landscape influences tactics and actions made by an officer. However, due to the resource management and battlefield protection mission of the ABPP, the physical landscape of a battlefield takes precedent over broad anthropological questions (Bright 2012:30). As such,

KOCCOA is the only framework used by the ABPP to determine what areas of a battlefield need to be protected. This also makes grantees operate within a standard framework to make their reports complimentary. As such, here it is presented as a separate analysis, including the redefining of terms for naval engagements (Babits 2011:3-4).

### *Key Terrain*

Key Terrain is defined as ground, most often high ground, which offers an offensive advantage or denies an enemy an offensive advantage by occupying it (United States Army 1992:2.8). In this sense, one position may not offer a specific advantage to a friendly unit but denies the advantage it could give an enemy unit. Babits (2011:3) goes on to say that in naval action, a dune one or two meters above the coastal plain can greatly enhance visibility over tidal flats. In regards to rivers and creeks, they offer fast and secure routes to fields of fire against an enemy.

Key terrain in the Battle of Elizabeth City was largely made up by the Pasquotank River. In this case, it is important to examine the river's bathymetry. Without significant water below the keel, a ship could not have maneuvered successfully to make an attack on the enemy fleet. On average, the Confederate fleet had ships of lighter tonnage and were therefore lighter in draft than their Union opposition, able to maneuver over much of the river. The Union needed significantly deeper water to fight in formation. The vanguard needed at least 10.5 feet of water to stay in formation due to *Commodore Perry's* draft; the second column needed at least 9 feet of draft to accommodate *Louisiana*; finally, the third column needed 9 feet of water for *Valley City* to float. Figure 59 shows the areas of the river that would have been accessible by each vessel. Depths marked in red were not accessible by ships of either fleet. Those marked in orange would have been able to be sailed by the Confederate fleet and ships of lighter draft in the Union fleet.

Finally, areas marked with in green were accessible by all ships in the engagement.

In regard to the Confederate position at Fort Cobb, the Confederate land component held the high ground. As the Union offensive was not an amphibious operation, this high ground position was merely more of raised platform above the river's plane. It may have offered slightly further visibility to Lynch while defending the fort. This would have given him a few extra moments of examining his enemy's force before relaying the information to his fleet. The fort also offered a solid platform for the four guns that could bear on the Union fleet. At the time of the Civil War, this fact remained important. The United States had not had a significant war after the introduction of steam-driven ships into the navy and much of the tactical knowledge of commanders was based on old sailing tactics. With such tactics, forts were more reliable than ships as fort guns were not reliant on winds, tides and currents, and they fired from a stable platform. A single fort gun was considered worth four on a ship (Luraghi 1997:11; Dougherty 2010:42). Therefore, controlling the high ground at Fort Cobb was still a significant factor for the Confederate defense.

Finally, Cobb's Point and Hospital Point across the river created a significant terrain feature. Between these two points on the river, a choke point was created. Lynch used this to his advantage and placed his steamers above the fort, in the narrowest portion of the river. By doing this, he forced the Union to sail through a narrow corridor, restricting their maneuverability and ability to mass their force completely on the Mosquito Fleet. Figure 60 shows the choke point with the same color coding found in Figure 59. Additionally, the potential archaeological evidence suggests that by using the choke point, Lynch's steamers were able to mass their artillery firepower in a narrow portion of the river as no potential ordnance were suggested closer to the Camden County side of the river (Figure 57). All potential spent artillery projectiles were

found in a line stretching from the middle of the river to Cobb's Point. This suggests that the Union ships were crowding together in a tight formation as they rounded the point, leading to a concentrated field of fire from all the Confederate steamers.

### *Obstacles*

Obstacles are features that restrict or completely eliminate unit movements. They can be either natural, such as an impassable mountain range, or artificial, such as intentionally sunk ships in a harbor. Babits includes as obstacles for naval engagements bathymetric features such as sandbars or the wind, as before steam technology, winds needed to be favorable to maneuver. Furthermore, for any forces on land, the water becomes an obstacle for mounting an effective attack, as these forces could not mount an infantry or cavalry charge over the water (United States Army 1992:2.8; Babits 2011:4).

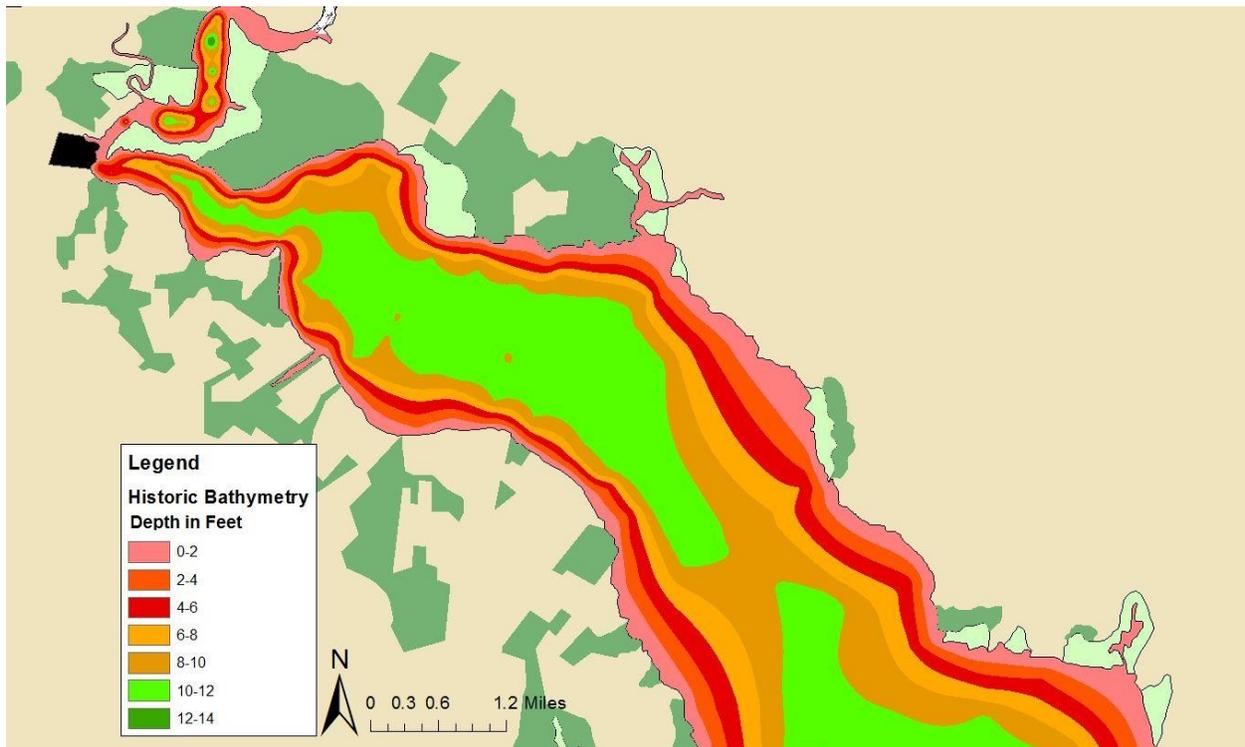


Figure 59: Battle of Elizabeth City Key Terrain (By Adam Parker).

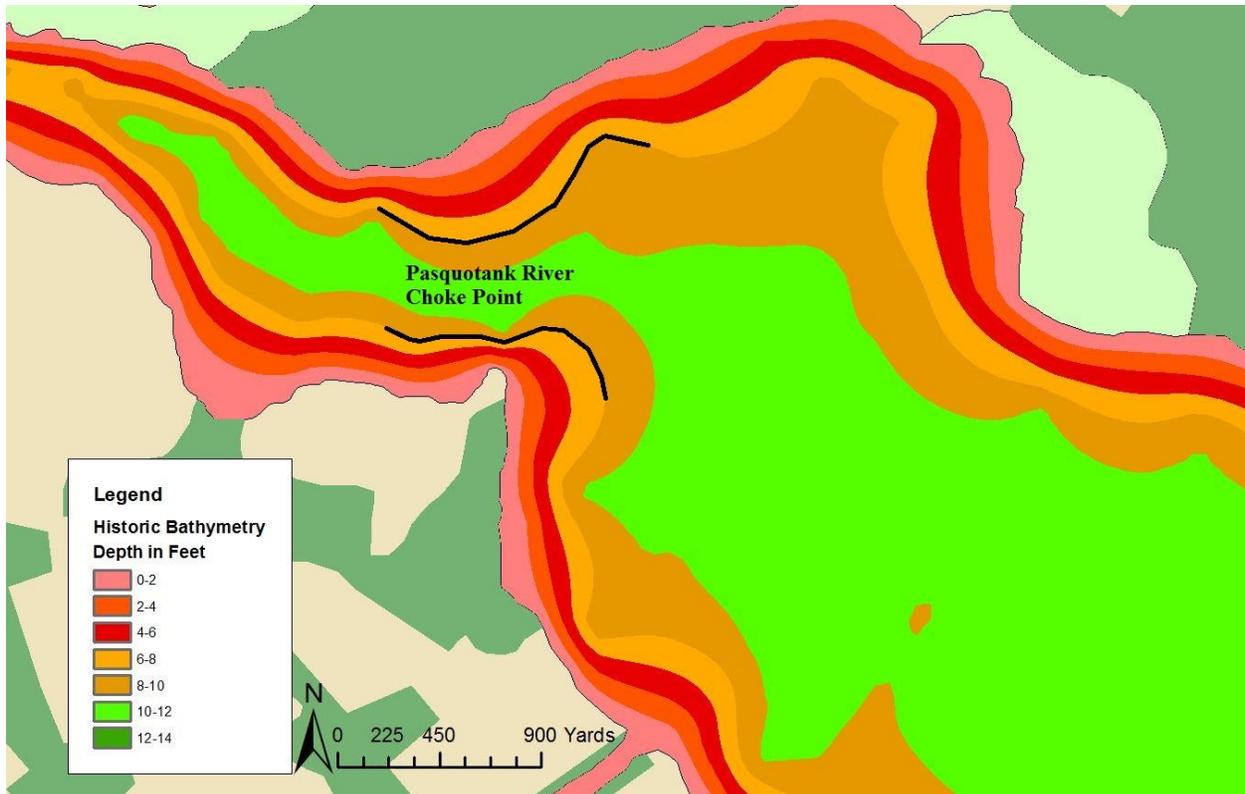


Figure 60: Key Terrain Surrounding Cobb's Point (By Adam Parker).

At the battle of Elizabeth City, there were very few obstacles of note. The choke point in the river described above represented the greatest obstacle to the Union fleet after the Confederate flotilla. For the Confederate defenders, the river presented the greatest obstacle, as once the *Beaufort's* crew was ashore, they could not continue the fight after the Federal fleet passed Fort Cobb. Nor could *Forrest's* crew or what members of the Wise Legion Colonel Henningsen had with him in the city make an attack against the ships from land without artillery in position. Colonel Henningsen could have used his field artillery, but much like Fort Cobb, his artillery would have been exposed and would have been routed with only a few charges of canister or grape shot.

#### *Cover and Concealment*

Cover is a feature that offers protection from enemy fire. Concealment on the other hand offers protection from enemy sight but not enemy fire (United States Army 1992:2.8). Babits

(2011:3) explains that due to a waterway's flat surface plane, concealment was not likely as all ships would be highly visible to other ships or forces on land unless masked by a battle line in front of another. Cover on the other hand could be provided by earthworks.

This is exactly the case at the Battle of Elizabeth City. All fighting of elements of the battle were exposed and visible by the other side. Thus, no options for concealment were possible, except perhaps Fort Cobb. Once the Union fleet closed in on the rebel fleet, the sailors and soldiers who were firing hand weapons could possibly take cover behind rails or bulwarks on the ship. However, the wooden construction of some of the steamers would become a death trap if struck by artillery fire. Fort Cobb offered cover for the Confederate defenders on Cobb's Point, but only for the time that the Union fleet was below the point. Due to the fort's construction, after the Union came abreast with and then steamed above the fort, no more cover was offered and Lynch and the Confederates would be vulnerable to fire.

### *Observations and Fields of Fire*

Observations are defined as features on the landscape that allow a force to observe the enemy. Fields of fire are defined as each weapon's capability, including maximum and effective ranges (United States Army 1992:2.8). Babits (2011:3) explains that observation is less important in a naval engagement than on land. Terrestrial defenses will be visible to approaching ships if they are not already known about (as any tree cover would need to be cut for effective shooting lanes) and the lack of cover on water means that approaching fleets would be visible to defenders. Fields of fire are dependent on the vessels ability to bring their artillery to bear, which may include factors such as winds, tide, currents, enemy fire. Thus, a field of fire may only be temporary before a ship has to change position.

The fields of fire were much more complex. Using the vessel armaments shown in Tables

2 and 3, and combining them with range data in Table 4, during the breakdown of temporal phases in the battle, both maximum and effective range capabilities of each side can be examined. Figures 61 and 62 represent the Confederate fields of fire when they opened fire on the Union fleet. Figures 63 and 64 represent the Confederate fields of fire when the Rowan gave his orders to dash on the enemy. Figures 65 and 66 represent the Union fields of fire when these orders were given. Finally, figures 67 and 68 represent the Union rearguard fields of fire once they too were able to engage the Mosquito Fleet and Fort Cobb. It is necessary to note that this GIS model is once again an interpretative tool and founded on historical data. Therefore, the model is highly abstract and may not represent each ship's *exact* location during the battle.

TABLE 4: Range Statistics for Naval Artillery at the Battle of Elizabeth City (Dahlgren 1856: 30-34; Barrett 1863:18; Holley 1865:478-481; Canfield 1969:20; Ripley 1970:369-370).

	32-pounder smoothbore (33/55cwt)	8 inch shell gun	9 inch shell gun	12-pounder rifled howitzer	12-pounder smoothbore howitzer	20-pounder rifle	30-pounder rifle	32-pounder rifled
Maximum range (yards)	1598/2731	2600	3450	2000	1600	4400	6700	8460
Effective range (yards)	<1300	<1300	>1300	1770	1200-1300 w/solid shot	3500	3500	3500

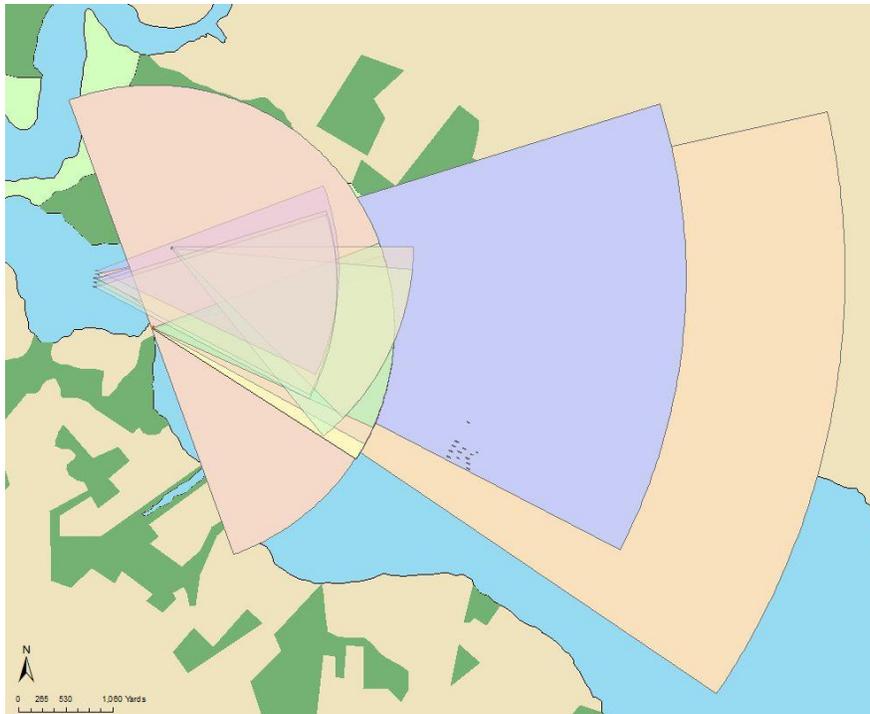


Figure 61: Maximum Confederate Fields of Fire with the Union Flotilla Two Miles from Fort Cobb (By Adam Parker)

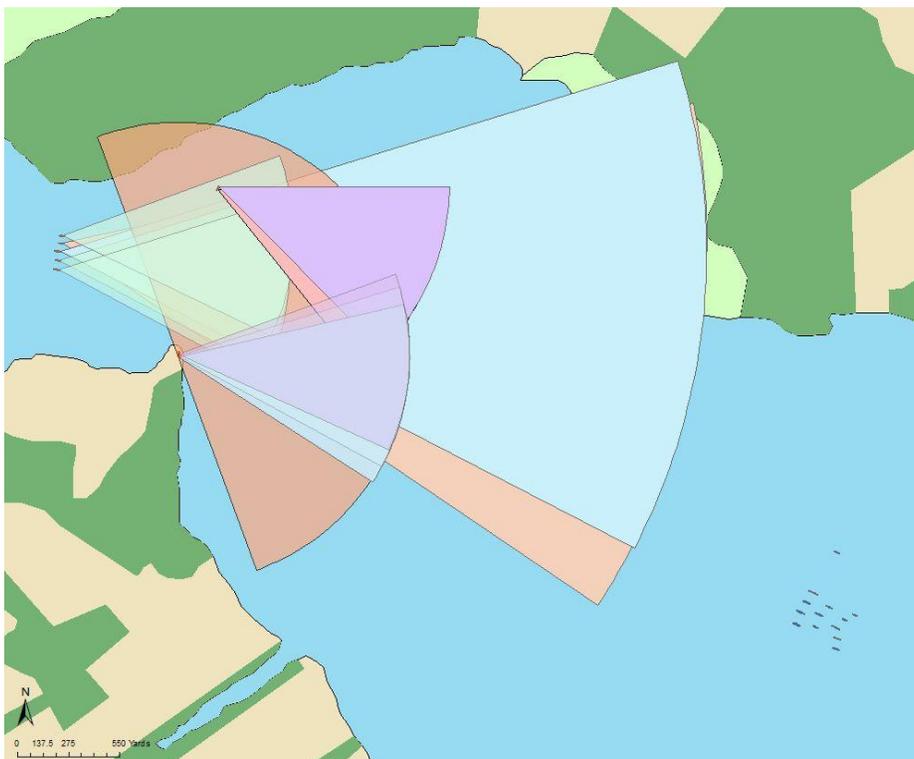


Figure 62: Effective Confederate Fields of Fire with the Union Flotilla Two Miles from Fort Cobb (By Adam Parker)

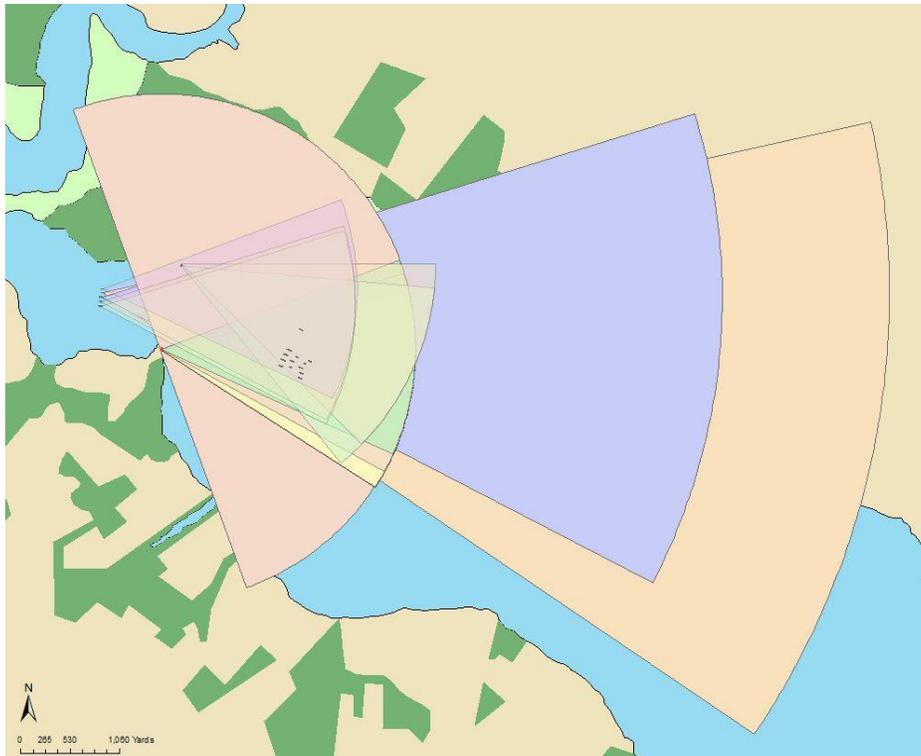


Figure 63: Maximum Confederate Fields of Fire When Rowan Gives Dash Orders (By Adam Parker)

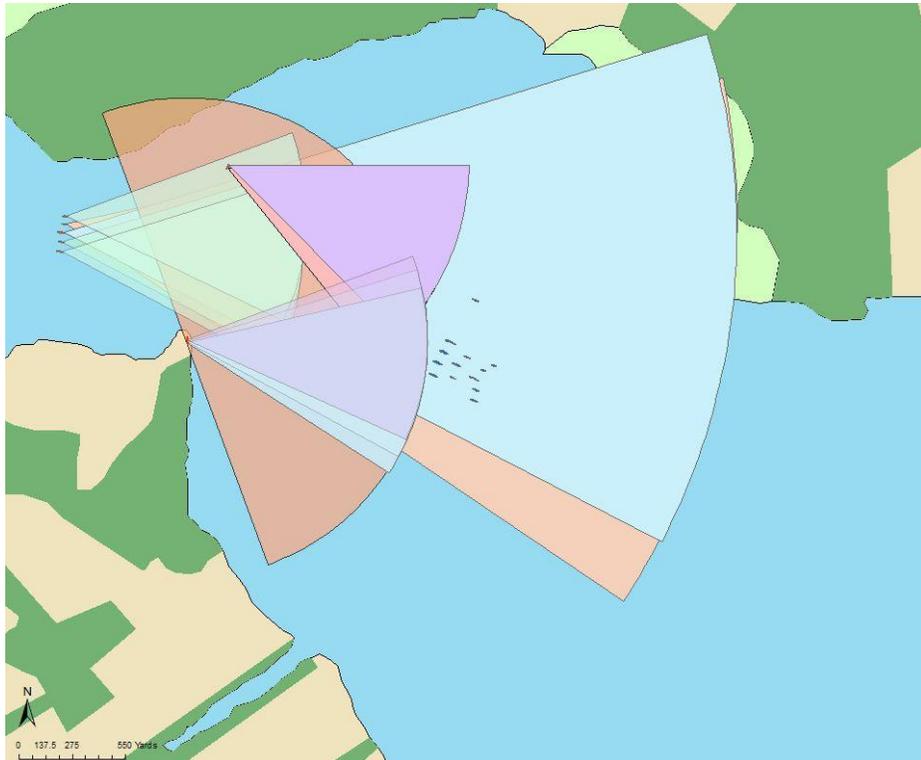


Figure 64: Effective Confederate Fields of Fire When Rowan Gives Dash Orders (By Adam Parker)

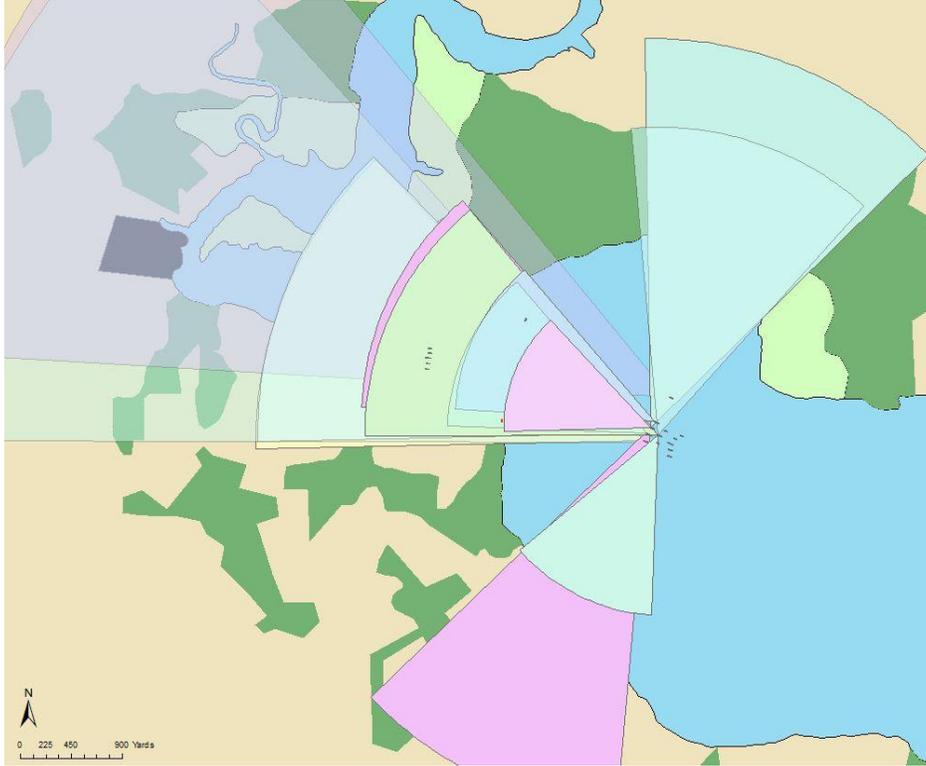


Figure 65: Maximum Union Vanguard Fields of Fire (By Adam Parker)

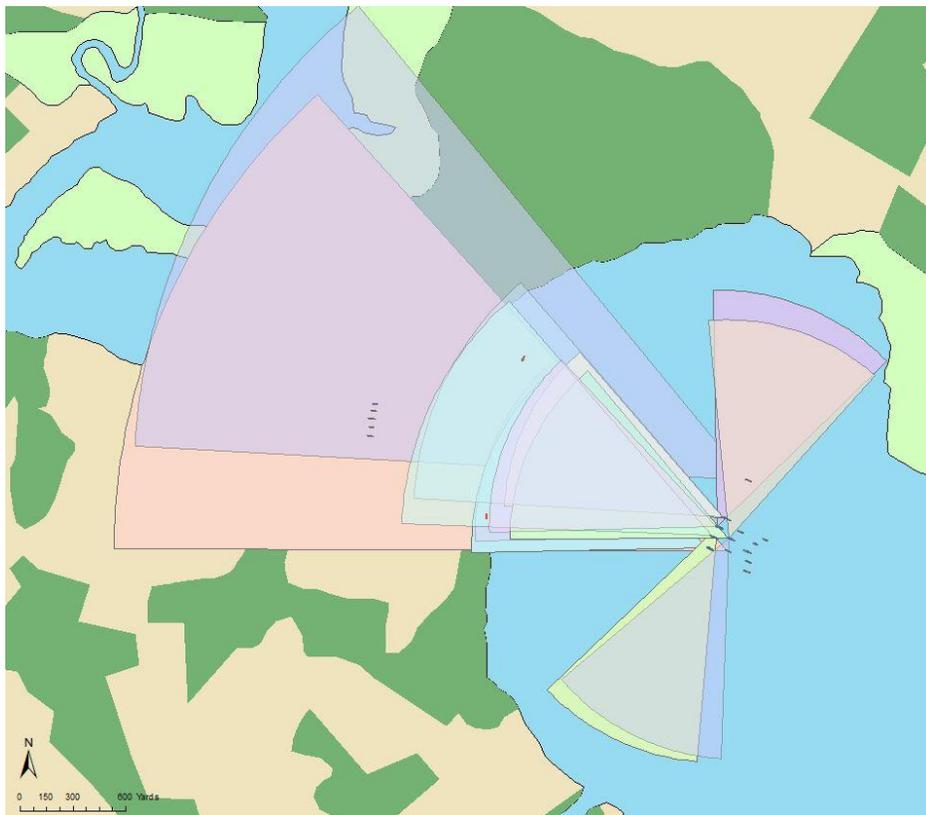


Figure 66: Effective Union Vanguard Fields of Fire (By Adam Parker)

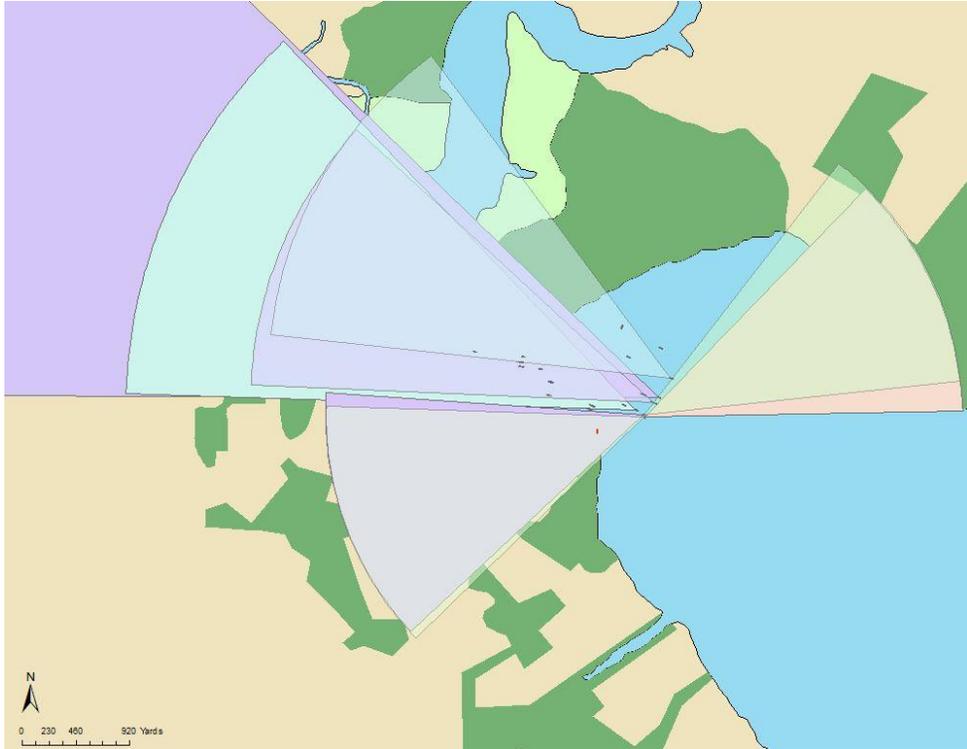


Figure 67: Maximum Union Rearguard Fields of Fire (By Adam Parker)

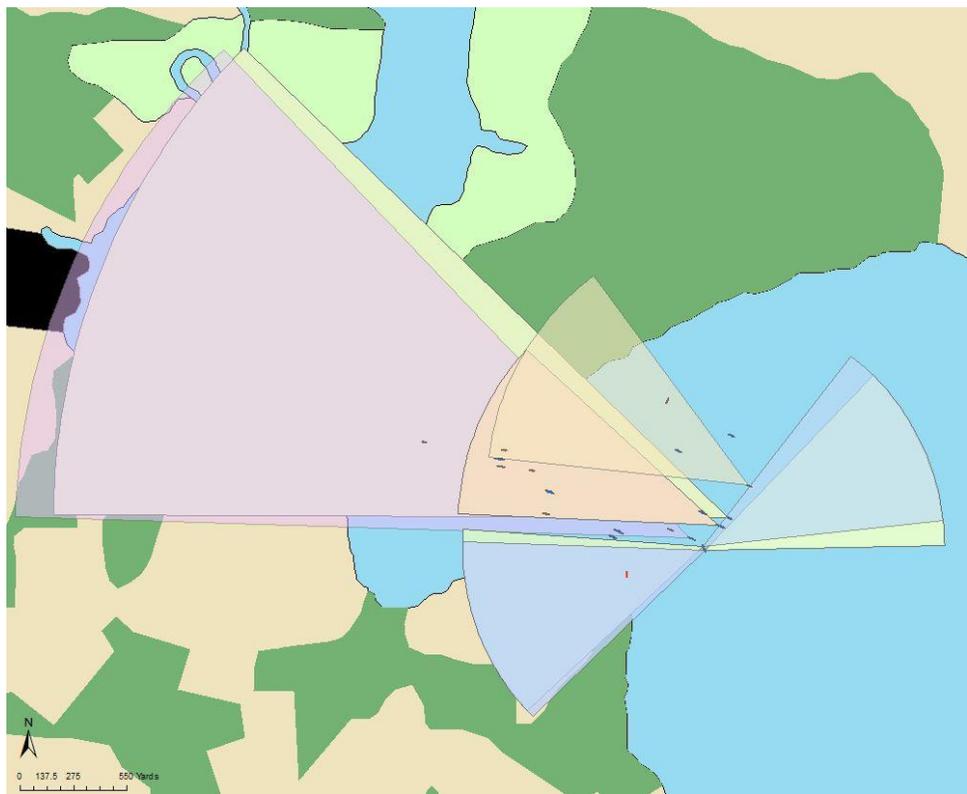


Figure 68: Maximum Union Rearguard Fields of Fire (By Adam Parker)

Several observations can be made based on the fields of fire models. First, Lynch was using the full range of his artillery when he began firing. Despite keeping up a brisk pace of fire that Rowan (1862b:606) describes as thick, the shots fired were ultimately inaccurate. Parker (1883:238) describes the Confederate fire as heavy. This led to wasting ammunition; he should have waited a bit longer and made each shot count. In a way, he was almost daring Rowan to come further. It is, of course, still reasonable that Lynch did this. Fort Cobb was the center of his defense. He needed to stop the Union fleet before it passed above the point, rendering the fort useless. Secondly, before the Union could enter the corridor that led through the choke point created by Cobb's Point, they needed to pass through a crossfire created by the fort and *Black Warrior*. Crossfires are deadly in any military situation, with enemy fire coming from either flank. Add this to the fact that the Union fleet was also facing fire from dead ahead by the Mosquito Fleet steamers, and it can be seen that they were facing fire from three directions.

The last observation that can be made is that Rowan waited until the Mosquito Fleet was well within his maximum ranges and almost within effective ranges of all his guns, except howitzers, before giving his orders to dash at the enemy. Due to the close proximity of his ships in the choke point, the rearguard needed to wait for fear of hitting friendly forces. Even so, as the Confederate line broke and the battle spread out, the southerners were well within range to fire on the enemy. Rowan waited so long to begin firing in an attempt to save ammunition until it was needed most and could effectively be brought to bear on the rebel fleet (Rowan 1862b:606).

#### *Avenues of Approach and Retreat*

The final concept in KOCO is Avenues of approach and retreat. This is defined as a route that, offensively, will bring a unit safely to the enemy's most vulnerable position and will, defensively, offer the most protection from enemy fire during a withdrawal from action. This is

most often associated with road networks and transportation routes. For a naval engagement, this can be any portion of the water that has sufficient depth to accommodate a ship's draft.

Additionally, winds and tides may stall an advance or retreat for sailing vessels (United States Army 1992:2.8; Lowe 2000:7; Babits 2011:4).

The Confederate forces had already set up their position the day before battle and spent the night anchored in formation (Parker 1883:236). Therefore, only their avenues of retreat can be discussed. They had two options for retreat: either up the Dismal Swamp Canal or through the Union formation and back down river to Albemarle Sound where they could use the Albemarle and Chesapeake Canal to escape to Norfolk. The latter option was a highly unlikely scenario of first slipping through the Union battle lines and then escaping the pursuit that would no doubt come from the Union rearguard. That left their only avenue of retreat the Dismal Swamp Canal, which was under repair by *Curlew's* crew. Parker states that the assumption was that the canal would still be under repair if a retreat was made when he says, "The canal being out of order, there was no escape in that direction, and the only option was to fight it out" (Parker 1883:236). Nonetheless, on the day of battle, *Beaufort* made a successful escape to Norfolk, and *Appomattox* made a successful retreat to the locks at South Mills before being scuttled. Additionally, a bend in the river above the city offered some tree line protection and cover for a retreat if needed. For the sailors in the fort, there was no road that led to or from the fort shown in the historic maps. They had no official avenue of retreat except through a field to a nearby tree line (Parker 1883:240).

The Union avenue of approach and retreat was the same: up the main channel of the Pasquotank River. However, the likelihood of them using the channel as a means of retreat were moot at best; no doubt it could have served that purpose. From their anchorage at the mouth of

the Pasquotank on the night of 9 February 1862, the main channel offered them the only method of approach on the Confederate position.

#### Modern Naval Tactical Theory (MNTT) Analysis

The MNTT analysis is meant to examine a battlefield from the perspective that a naval officer would have in much the same way that a terrestrial military officer uses METT-T and KOCOA to examine a terrestrial battlefield. Since METT-T and KOCOA are based upon terrestrial military tactics, using them on a naval battlefield assumes that naval battles follow the same logic as land battles. This, however, is not necessarily the case. Naval tactics are less organized than terrestrial tactics, allowing individual ship commanders to attack as they see fit so long as their actions continue to work toward their superior officer's main objective. This can be seen in several instances historically. During the 1588 Armada Campaign between Spain and England, Sir Francis Drake left his position in formation to lead an attack on a stranded Spanish galleon before returning to position the next day (Martin and Parker 1988:152-153). During the American Revolution (1775-1783), John Paul Jones, in 1778, was given orders to raid British shipping. He followed his orders to raid shipping but attacked ports as well (Konstam 2001:173). For a modern example, the German U-boat *U-576* made a solo attack against Convoy KS-520 in 1942 during World War II (1941-1945) instead of calling other U-boats to attack as a “wolf pack” (Bright 2012:164). This high degree of independence, the nature of naval maneuver warfare as opposed to terrestrial attrition warfare (discussed in Chapter 2), and environmental differences Babits (2011:3-4) notes in his redefining of KOCOA's terms, necessitate an examination of a naval battle through the eyes of naval tactics.

MNTT is based on four key concepts of maneuver warfare formalized by the United States Navy, in Naval Doctrine Publication (NDP) No. 1. The four concepts pertain specifically

to power projection: center of gravity, critical vulnerability, focus of effort, and main effort (United States Navy 1994:26). While these tactical principles were formalized in 1994, especially as the Air Force and Marine Corps were adopting joint-operations doctrine, the naval tactics were actually nothing new to the navy and had been conventional wisdom and unspoken doctrine in the navy for a century at least (Cooper 1995). This presents itself as the naval equivalent to METT-T and KOCOA and will be the framework used to explore the Battle of Elizabeth City. In this section, each concept will be broken down for each belligerent and analyzed.

### *Center of Gravity*

The center of gravity of a naval engagement is the element or feature the enemy controls that is the source of their projected power. Without the center of gravity, the enemy can no longer project their power and continue fighting. There can only be one center of gravity for each belligerent although the center of gravity may not be strong in and of itself (United States Navy 1994:35).

### Confederate

For the Confederates, the Union center of gravity is difficult to discern. The choke point that Cobb's Point creates is the key to understanding the center of gravity for the Confederate defense. The Union was sailing in a tight wedge, or echelon, formation (Creecy 1901:223-224). This means that if Lynch and his fleet could stop the column's vanguard in or just below the entrance to the corridor through the choke point, the vanguard would become an obstacle to rest of the fleet, trapping them below Cobb's Point and within range of the Confederate guns. With *Black Warrior* acting as a floating battery on the opposite side of the river, Lynch hoped the crossfire would disable Union fleet's center of gravity while his steamers blocked the river channel and fired at will on the trapped Union second and third ranks.

## Union

The center of gravity of the Confederate defense in the eyes of the Union may, at first, seem to be the Mosquito Fleet. Upon closer examination, this theory does not hold up. The Mosquito Fleet was not the backbone of Lynch's defense; Fort Cobb was. Lynch could lose every one of his ships, but so long as he held the fort, he could continue fighting. This is a case of the center of gravity not being strong in and of itself. The ships of the Mosquito fleet mounted more guns that were more mobile and could be fired more effectively than the fort. The fort was strong because the fleet aided it.

Nonetheless, Rowan could sink every ship, but if he did not defeat the fort, Lynch and Parker could call the crews of *Beaufort* and *Forrest* and Colonel Henningsen could call upon the Wise Legion and his field artillery to mount such a resistance as to retain possession of the town. This would force Rowan to land troops, a consideration he had not made the night before when issuing orders to his officers. In this case, Rowan would have to immediately switch his plan of attack to an amphibious assault. With the detached companies from the Fourth Rhode Island Volunteers he had with him, a landing was feasible, but it would require “on the fly” planning and execution. Therefore, Fort Cobb could be considered the center of gravity in the eyes of Commander Rowan.

### *Critical Vulnerability*

The critical vulnerability of a naval engagement is the resource that is going to allow a force to destroy the enemy's center of gravity. This does not have to be a physical feature or element to a battlefield. There can be time sensitive factors such as troop morale. There can be several critical vulnerabilities to exploit during a naval engagement, but they all support the center of gravity in one form or another. Therefore, direct offensive action against the critical

vulnerability will result in a negative outcome at the center of gravity (United States Navy 1994:35).

### Confederate

The Confederate defense strategy had only two critical vulnerabilities it could exploit to access the Union center of gravity: Union morale and its tight formation. These critical vulnerabilities were both time sensitive, as once the Union sailed above Cobb's Point, they would see how vulnerable Fort Cobb was and the Confederates would lose any chance of breaking Union morale (keeping in mind that Lynch did not know that Rowan had intelligence about Fort Cobb). At the same time, as Rowan's force was entirely made up of steamers, it had the mobility to change formations quickly.

In order to break Union morale, the rebels began firing early, when the Union came within range of their guns. They continued to fire rapidly. In a sense, it was psychological warfare. They were bluffing at how strong a position they held in hopes that Union morale would fade and they would retreat to Roanoke Island. If Union morale faltered and they continued their advance but began firing before Rowan's orders were signaled, they may have expended their ammunition before making an effective attack, given that they only had 20 rounds per gun and they were unaware of the Confederate ammunition situation. This would have left them vulnerable to Confederate fire without means to retaliate if they tried to board the Mosquito Fleet or forced them to retreat to Roanoke Island to resupply, which would give the Confederates time to resupply as well.

The rebel forces could also use the tight Union formation to their advantage. If Creecy is correct and the Union was sailing in a tight formation, the Confederates would be able to concentrate their fire as the Union flotilla advanced closer; especially just before the Federal fleet

entered the choke point corridor. Although they knew that Rowan was a dashing officer, Lynch expected him to bombard Fort Cobb before moving against the Confederate fleet based on Rowan's battle conduct at Roanoke Island. If the Union fleet stopped short of the corridor to bombard Fort Cobb, it would become a large stationary target to fire upon with all Confederate guns, possibly disabling the vanguard. At that point, the tight formation would have either collided with the disabled vanguard, broke formation or stopped completely, offering an unmoving target for the Confederates to train their guns on.

### Union

The Union had two critical vulnerabilities to exploit in order to destroy the Confederate center of gravity at Fort Cobb: Confederate morale and the Mosquito Fleet itself. The aspect of Confederate morale is a simple one. They suffered a major defeat at Roanoke Island only days before. They had been beaten and were still licking their wounds as it were. Defeated forces typically begin a new battle with lower morale, which is why it is common for a military commander to pursue a retreating enemy and force them to defend their rear positions soon after the initial battle to exploit the lower morale coupled with lower force strength due to casualties sustained. At Roanoke Island, not only had the Confederates been soundly beaten, but they had seen the power of the Union fleet when it sank *Curlew* and disabled *Forrest*. Those mental images of defeat were fresh in their minds. Even the morale of the officers was low: "I passed that evening [9 February] talking over matters with the commodore, and we both concluded that affairs looked blue" (Parker 1883:236).

The Mosquito Fleet itself was a second critical vulnerability. Rowan's direct orders from Goldsborough were to pursue and destroy the Confederate Fleet. As such, it was ostensibly his main objective. In reality, taking the city was the true main objective according to McClellan's

orders. In order to take the city, he had to deal with Fort Cobb. In order to conquer Fort Cobb, he needed to exploit its supporting strength. As discussed above, Fort Cobb was not in and of itself strong. Its strength came from the Mosquito Fleet. Therefore, Rowan resolved to eliminate the fort's supporting firepower first, before turning on it.

Once again, the idea that the Mosquito Fleet was a critical vulnerability lies in the outdated naval wisdom of the time. Guns on ships were not as reliable as guns on land. Rowan had seen at Roanoke Island how the times were changing and how forts were not as reliable against steam-driven ships. This did not mean that the conventional wisdom was wrong. It merely meant that forts were no longer as secure as they had once been. His intelligence said that Fort Cobb was vulnerable from the rear. To exploit that weakness he would have destroy the Mosquito Fleet to capitalize on the fort's vulnerability. Both conventional wisdom and intelligence told him that to stop and bombard the fort was not the action to take and instead dash on the enemy fleet first.

### *Focus of Effort*

The focus of effort is the paramount objective of the operation and directed toward the critical vulnerability. By making a successful offensive action against the critical vulnerability, exploitation of the center of gravity can begin. It is paramount to choose the focus of effort before an engagement begins so all resources and energy can be allocated to completing the focus of effort (United States Navy 1994:37). Once obtained, the resources and energy can go into exploiting the center of gravity.

### Confederate

The Confederate focus of effort was to defeat the Union flotilla by either breaking Union morale or targeting the tight Union formation to disable or destroy the Union vanguard. The

historical record shows that the Confederates fired hard and swiftly during the Union approach, in an attempt to break their resolve to engage (Rowan 1862:607). Their attempts to break the Union vanguard column can be seen in the potential archaeological data as well. As the Union fleet came abreast of Cobb's Point, entering the chokepoint, Confederate fire was concentrated in a straight line across the channel attempting to stop the vanguard from advancing (Figure 57). The data supports the idea that the Confederate fleet continued its heavy firing hard until it learned boarding action was inevitable.

The area where the Confederate artillery signatures are found is outside the fields of fire of both Fort Cobb and *Black Warrior* (Figures 63 and 64). The eight possible Confederate artillery anomalies can be associated with four steamers, as the crew of *Beaufort* had been summoned ashore to work the guns at Fort Cobb. Furthermore, *Appomattox*'s main gun spiked accidentally, although it is not known if this happened before or after Rowan's orders to make the dash had been given (Parker 1883:237,239). This means that those final volleys could be associated with only three of the Confederate steamers. This seems to contradict Rowan's account that Confederate morale faded quickly when the dash was made and that they continued their attempts to break the Union vanguard until nothing remained but to repel boarding parties (Rowan 1862:607-608).

### Union

The Union focus of effort was to make a concentrated attack on the Confederate fleet and destroy it. From there, Fort Cobb could be destroyed from the rear (Rowan 1862:606-607). This interpretation would be supported by the potential archaeological evidence in Figure 57. The signatures present in the surveyed area that may be associated with Union artillery fire suggest that the vast majority of Union fire was directed at the fleet of rebel steamers. There are few

signatures that suggest a large scale bombarding of the fort (from possible shots that could have fallen short of the fort as the rearguard trained their guns when they could begin firing). This means that archaeological data could be in agreement with the historical record, as Parker states that as the first two columns of the Union fleet passed Fort Cobb, the flag was lowered at the fort and a retreat ordered before the fort's vulnerable flanks and rear could be made a death trap (Parker 1883:240).

### *Main Effort*

The main effort of a naval engagement is the group or unit chosen by the commanding officer to be directed at the focus of effort. There is only one main effort for a battle and all other units and resources are directed in support of that. The main effort may be comprised of the bulk of the force or may be only a fraction. No matter the size of the main effort, all other units must support it. While there may only be one main effort at any given time during an engagement, a commander can switch main efforts in the middle of an engagement if deemed necessary (United States Navy 1994:38).

### Confederate

The Confederate main effort throughout the battle was Fort Cobb. Lynch had placed his entire defense on the fort. The Mosquito Fleet offered support fire and strength to the fort-focused defensive strategy, much like muscle on bone. While it could be argued that the main effort switched to the fleet after the Rowan gave his dash order, this was not a conscious order made by Lynch. Instead, it was a situation that arose during the course of the battle while Lynch, Parker, and their sailors fought on in the fort until ultimately retreating.

### Union

The Union main effort consisted of the vanguard. They were in prime position to carry out

Rowan's orders of dashing on the enemy and breaking the Confederate battle line while the second column and rearguard would support them with covering fire before they attacked and boarded the Confederate steamers. They carried out their orders fully: *Commodore Perry* rammed and sank *Sea Bird*, *Ceres* boarded and captured *Ellis*, *Morse* and *Delaware* were the first to attack the grounded *Fanny* after *Commodore Perry* set it ablaze, and *Underwriter* was the first to pursue *Beaufort* and *Appomattox*. The second column supported the vanguard, as did the rearguard after the battle had spread out above the bottleneck Cobb's Point created.

At this point, the critical vulnerability had been destroyed and the focus of effort obtained. From that moment, the main effort was switched to *Valley City* in the rearguard, whose orders were to attack Fort Cobb from the rear. By this time, such action was unnecessary, as Parker had ordered the fort evacuated. This did not stop the Union ships from sending a few shots in the general direction of the retreating sailors before the engagement ended (Parker 1883:240).

### Comparisons

Between the METT-T analysis and MNTT analysis, there are several similarities. Both ask commanders to consider the mission they have, albeit in different ways. METT-T asks an officer what his or her objective is with the element Mission and to consider its meaning and the objectives of two command levels higher. The MNTT framework also asks an officer to choose a mission after deciding a critical vulnerability and organize resources around that mission, or focus of effort. Both MNTT and METT-T ask officers to consider the enemy's forces, once again, in different ways. METT-T considers the relative weakness and resources of the enemy under the concept Enemy. An MNTT analysis of an engagement first asks what the enemy's strongest position is, and then what elements of the enemy's resources make that position vulnerable.

While this is a comparison between the two, there is a fundamental contrast between these concepts that will be discussed in the next section. Finally, both analyses ask a commander to consider his or her own resources. Under the METT-T framework, this is done with the concept of Troops Available. Under the MNTT framework, this is considered when a commanding officer assigns the main effort and if he or she chooses to switch a different force to become the main effort mid-battle.

Between MNTT and KOCOA, there is not much to compare. The one similarity between MNTT and KOCOA are that they both ask commanders to consider the resources available to them: KOCOA with troops available and fields of fire and MNTT in the form of considering the main effort. In essence, these two frameworks provide two different datasets that serve different purposes.

#### Contrasts

Between METT-T and MNTT, there is a fundamental contrast in how the question of the enemy's strengths and weaknesses are addressed. When considering the enemy in the METT-T framework, an officer is charged with examining the size, tactics, weapon systems, and weaknesses of the enemy, while also examining the greatest threat the enemy poses to the officer's unit. The MNTT framework asks an officer nearly the same questions, but from a different perspective. Instead of asking what the greatest threat the enemy poses to the officer's ship or fleet, the MNTT framework asks: what is the enemy's most important asset to continue effectively fighting. This is not followed by the question, what are the enemy's greatest weaknesses? Instead the question is, where is the enemy vulnerable?

The two questions are very similar in nature. Both are asking how best to defeat the enemy. However, a vulnerability as addressed by MNTT is not necessarily a weakness. In some

respects, the Mosquito Fleet was Lynch's strongest asset. It was a small fleet, but it was highly mobile and fairly well armed all points considered. In the case of the Battle of Elizabeth City, it was not the main element of Lynch's forces that would allow him to continue the fight. If he lost all the ships in this case, his fight was not over; Fort Cobb was the element that would allow him to continue fighting even if he lost his whole fleet. Instead, the fleet was a vulnerable portion of his defense that could be exploited to gain access to his center of gravity. From a METT-T perspective, Lynch's greatest weakness was Fort Cobb due to its poor construction and limited artillery capabilities while the Mosquito Fleet merely represented additional units and weapons. Therefore, a direct assault on Fort Cobb from a landed group of soldiers may have been the best course of action according to METT-T.

A similar argument can be made for Rowan's fleet. According to the METT-T framework, the Union vanguard would have been the fleet's greatest strength due to its armament and its weaknesses may not have been properly addressed. While MNTT agreed with the fact that the vanguard was the fleet's greatest strength, had the vanguard been disabled, it quickly would have become the fleet's weak link. It would have blocked the channel for the other two columns, forcing them to either fight from a position of not utilizing their guns to the fullest effect or forcing a retreat.

The fundamental difference between these two frameworks relates to the nature of war on land and at sea. War on land is attrition based: both belligerents field an army and send the soldiers at each other, until one side loses too many men or are out-fought due to superior tactics and are forced to retreat. War at sea is based on maneuver warfare: a commander does not send a force against an enemy head on. Instead, the commander looks for enemy weak spots in order to concentrate an offensive attack before maneuvering forces to a new weak spot that opens up due

to the enemy reinforcing the area under attack. In maneuver warfare, the commander freely makes decisions and adapts to situations as they arise. Whereas attrition based warfare is direct, head-on, and costly in terms of personnel and resources for both belligerents, maneuver warfare is indirect and, in most cases, not as costly (United States Navy 1994:33). This can be seen with the idea of commander's intent. At the Battle of Elizabeth City, Rowan's intent was outlined as destruction of the rebel fleet and then Fort Cobb. Those vessels closest to the problem of the rebel fleet, the Union vanguard, had the freedom to attack as they saw fit. *Underwriter* abandoned its attack on *Sea Bird* to pursue *Beaufort* and *Appomattox* without direct orders from Rowan to do so. *Commodore Perry* did the same with *Sea Bird*. *Shawsheen* was directly waved off from *Fanny*, but independently made the decision to assist *Underwriter* in its chase. *Ceres* also was not ordered to board *Ellis*. Lieutenant MacDiarmad made that decision in the heat of battle.

Between MNTT and KOCOA, there are several contrasts. The MNTT framework does not explicitly ask a commanding officer to examine the battlefield's surrounding terrain, obstacles impeding an approach, or avenues of approach and retreat. Instead, the objective of the mission, the focus of effort, is addressed and how that focus of effort is to be obtained. There is no doubt that considerations of the terrain in a littoral combat zone will come into play; however, it is not a question that is at the foreground of the elements defining a naval battle. In fact, because the MNTT framework was adopted as the naval component to joint operations doctrine, these considerations would fall under a jointly operating unit, such as an air force or Marine Corps. There are fewer dynamics to navigate when considering a purely naval engagement, as the engagement will occur on a flat plane (until submarine warfare is introduced) with no cover, concealment, or key terrain. In essence, these two frameworks represent different datasets that

both have their purposes.

The final contrast that can be made is one of MNTT's weaknesses as a framework. METT-T and KOCOA both work well as tools to explore both offensive and defensive tactics and considerations. MNTT, on the other hand, is based in power projection (United States Navy 1994:26). Power projection is offensive by nature. The MNTT framework is necessarily best suited when examining an attacking force. As the discussion above shows, it can be applied to a defensive force, but its elements, by their nature, were not developed to be used as a defensive framework.

### Conclusion

In this chapter, three analyses were applied to the archaeological and historical data collected in Chapter 5. Two analyses were broad based frameworks that ask commanders certain questions when preparing for an engagement. One, METT-T, is based in terrestrial warfare. The other, MNTT, is based in naval warfare. The third analysis, KOCOA, is the theoretical and methodological framework employed by the ABPP for the purpose of resource management and the protection of historic battlefields. Each element in these analyses was interpreted to gain insight on why the commanders made the decisions they did during the battle. Finally, each analysis was compared and contrasted as to ascertain the merits of each in examining a naval engagement.

## Chapter 7 Conclusion

### Introduction

This chapter concludes the present study by first discussing the operations undertaken with Elizabeth City as a base and then bringing all the data and interpretations from the previous chapters to address the research questions posed in Chapter 1. The present study consisted of a multi-staged approach to the study of naval battlefields, using the Battle of Elizabeth City as a case study. Building on the application of military terrain analysis on naval battlefields by Babits (2011), McKinnon and Carrell (2011), Bright (2012), and Simonds (2014), this study sought to introduce theory based in naval tactical thought to the studies and determine its merits in amending KOCOAs for the study of naval battlefields from an anthropological point of view.

### Operations Undertaken With Elizabeth City as a Base

Few operations conducted after the Battle of Elizabeth City were in Albemarle Sound. Rowan quickly sent Lieutenant Murray with *Louisiana* to Edenton, North Carolina on the Chowan River, another important river port on Albemarle Sound. *Underwriter*, *Commodore Perry*, and *Lockwood* joined *Louisiana*. The small force steamed into Edenton's harbor on 12 February 1862 at 8:30 A.M. *Lockwood* was the advance vessel keeping an eye open for earthworks and informing the other vessels of the water depth. By 10 A.M., the small force had taken control of Edenton without a fight. Murray destroyed eight cannon and a schooner on the stocks. He also captured two schooners. Finally, Murray put down rumors that Union troops had started the fire at Elizabeth City (Murray 1862:637).

On 14 February 1862, Lieutenant Jeffers with *Lockwood*, *Shawsheen*, and *Whitehead*, towed two schooners to the Albemarle and Chesapeake Canal. They discovered that Confederate forces had already begun obstructing the canal before they reached it. One schooner was already

sunk 50 yards from the mouth of the canal, supported by logs and piles. Beyond, up the channel, a dredging machine was sunk, effectively blocking the canal. At the same time, Brigadier-General Henry Wise's troops were retreating via the bridge. Some of those men fired on the steamers with muskets, but a reply of three nine-inch shells sent the rebel troops on their way. Jeffers completed the closing of the canal mouth by sinking the other two schooners and burning what was above the waterline. After that, he returned with the steamers to Elizabeth City (Jeffers 1862b:638-639). Furthermore on 14 February, Lieutenant Chaplin of the *Valley City* informed Commander Rowan that the machinery of *Sea Bird* and *Fanny* had been successfully destroyed (Chaplin 1862b:646).

With the taking of Elizabeth City, in less than a week, the Union had gained nearly complete control of northeastern North Carolina and Albemarle Sound. Periodic reconnaissance missions were completed throughout February 1862. Rowan reported using Elizabeth City as a rendezvous point for vessels before inspecting the Chowan River and engaging North Carolina troops in Winton, North Carolina on 18-20 February 1862 (Rowan 1862b:654-655). In April 1862, after learning that the Confederates in Norfolk were constructing an ironclad, Burnside ordered troops to Elizabeth City to destroy the locks at South Mills before the ironclad could threaten the Burnside Expedition's naval power. When the Union forces met heavy resistance, they retreated back to New Bern as Burnside ordered them not to spend much time on the mission (Hess 2005:65).

Elizabeth City was neither a major battle nor a long and deadly one. Even so, it remained significant to the rest of operations in North Carolina. No longer could the Confederacy count on a permanent fleet for protection in the extensive waterways of eastern North Carolina. Other than Hatteras Inlet and Roanoke Island, the only ways to enter Albemarle Sound were cut off. The

Albemarle and Chesapeake Canal was closed off and to use the Dismal Swamp Canal would end the trip in a Federally occupied river port. The battle may not have been of isolated significance, but to the success of the Burnside Expedition as a whole, the victory at Elizabeth City was monumental and very significant. A soldier captured the importance of the victory afterward in a short stanza:

The Burnside Expedition, it did not end in smoke.  
It captured Elizabeth City, and the Isle of Roanoke (Merrill 1957:98).

### Research Questions

The first step of the research was to investigate and analyze the documentary record for the general narrative leading up to the Battle of Elizabeth City, the battle's detailed narrative and aftermath, and statistics on each vessel that participated in the engagement as well as each piece of artillery's range capabilities. The second step was to create a GIS-based model of the battlefield, not only spatially but also temporally. This model subsequently helped narrow down survey zones for a limited side scan survey, the results of which helped define the battlefield's perimeters. Finally, the data were examined through each of the frameworks to evaluate the merits of each in discussing approaches to studying naval battlefields. These frameworks were METT-T, a KOCOA framework revised for maritime environments, and Modern Naval Tactical Theory, MNTT.

By using modern naval theory to examine a naval battlefield in a categorically systematic fashion in the same way that KOCOA and METT-T were used in past studies, interpretations on how each force of the battle would have viewed their respective offensive and defense options. In this sense, it is the first of its kind to examine a naval battlefield from this theoretical standpoint. The study was not without its shortcomings and following a review and discussion of the research questions, a section describing the shortcomings of the study and possibilities for

future research will be discussed.

*Can the application of MNTT within the KOCOA/METT-T framework result in more efficient recreation of the tactics employed as well as documenting of the military landscape of a naval engagement, specifically the Battle of Elizabeth City?*

There is significant supporting evidence that shows that using MNTT within a METT-T/KOCOA framework allows for more efficient documentation of a naval battlefield. Whereas METT-T and KOCOA can fundamentally be attributed to attrition-based warfare, MNTT is fundamentally based in maneuver warfare. As such, the elements that make up MNTT's framework are based upon how a naval leader examines a potential engagement differently than a terrestrial military leader would. With this in mind, the MNTT framework was able to discern how maneuver-based warfare at the Battle of Elizabeth City was conceived in the minds of the commanding officers and influenced the flow of the battle. Furthermore, MNTT takes into consideration the decentralized nature of maneuver warfare, putting it in contrast to METT-T and KOCOA, both of which were developed from the highly centralized command structures and organizational systems found in terrestrial military forces. The decisions of individual ship officers, working together to achieve an objective but independently enough to decide how to engage the enemy could all be examined with MNTT.

The largest drawback to MNTT is that it does not take into consideration terrain features. As it is based on NDP-1, it relates foremost to naval power projection in joint operations. The terrain component of a joint operation would fall under the consideration of either the air force, Marine Corps, or both. As such, MNTT falls short of being a complete theoretical framework when examining naval engagements that occurred in littoral zones. MNTT explained a large deal of why commanders used the tactics that they did at Elizabeth City. Nevertheless, the story was

not complete without looking at the battle through the lens of KOCOA. Future studies using this framework may work best with a combined KOCOA-MNTT framework, as both datasets complement each other by taking into consideration what the other does not. In regards to blue water naval battles, MNTT alone holds promise for being a viable theoretical framework, as few of KOCOA's elements are present in open water engagements.

Finally, because of its fundamental base in power projection, MNTT had some drawbacks regarding its use to analyze defensive tactics. It ideally fits within offensive maneuver warfare. There is little to no discussion in NDP-1 on how to apply the concepts to defensive maneuver warfare.

Despite these drawbacks, the present study has shown that MNTT does offer a viable framework for examining naval battles. In blue water battles, it may prove to be a standalone framework while in littoral zones, it may need to be combined with KOCOA. In either case, it allows for more in depth investigations of naval battles in investigating out warfare at sea differs from warfare on land.

*How does the geographic proximity to terrestrial features affect naval tactical theory?*

Geographic proximity to terrestrial features can highly affect the tactics employed by a naval force. In the present study, it can most aptly be seen in Lynch's plan of defense. He used the position of the fort on Cobb's Point along with the schooner *Black Warrior* across the river to create a crossfire the Union fleet would need to pass through to enter the corridor leading to the navigable channel in the bottleneck Cobb's Point created. Thus, Lynch's defense made extensive use of the surrounding terrain.

Furthermore, Rowan's battle formation was heavily influenced by the terrain. In the case of the Union fleet, all vessels needed sufficient draft in the shallow Pasquotank River. Without

local knowledge of the river's bathymetry, staying in a close formation would have immediately alerted them to any shallow spots in the river while *Ceres* reconnoitered for shallow areas on the right flank of the main formation.

The Battle of Elizabeth City is a perfect example of how terrain affects naval tactics, even fleet-on-fleet tactics. The battle shows that in littoral combat zones, terrain features must be accounted for in the planning and execution of a battle. In an archaeological study, a KOCOA analysis explains can help explain how and why those terrestrial features affected the tactical preparations and execution of commanding officers.

*How do weapon and vessel technological advancement affect naval tactical theory?*

In the case of the advancement of naval gunnery, it was the addition of rifling to guns to that affected tactical theory most. Adding rifling to naval artillery meant that the guns could fire more accurately over a distance. Therefore, ships only needed to sail outside the range of fort's guns to effectively bombard the position. Between two ships, "stand-off" firing no longer became the main method tactical defense. Rifled artillery had a greater range than smoothbore artillery, and if a ship were armed with rifled guns, it had the chance to accept the fight instead of choosing a rapid fire to dissuade boarding action.

The advancement of steam technology heavily influenced naval tactics. As steam navies replaced sailing fleets, the realization that tactical change would follow was soon made. Steam navies were more mobile than sailing navies. They were no longer at the mercy of winds, tides and currents. A fleet no longer required the weather gauge to initiate an attack and bring their arms to bear. While the Europeans began realizing this during the Crimean War (1853-1856), the United States did not come to this realization until the Civil War. They had been at peace since the Mexican-American War (1846-1848) and had not used their steam navy in full combat up

until the Civil War. As such, at the beginning of the war, conventional sailing tactics were still regarded as prevailing wisdom. More faith was placed in fort guns and coastal defense; especially for the Confederate defensive strategy (even the Union's coastal defense system was largely outdated as sailing tactics were still prevailing wisdom there as well). A single fort gun was considered worth four at sea. They were stable and not reliant on winds and tides. Thus, when steam navies began entering the narrative in force, tactical changes were necessary to bring a force to bear effectively.

*Can these changes in tactical theory be quantified archaeologically using METT-T/KOCCOA survey?*

The changes in tactical theory can be quantified through archaeological survey using the METT-T/KOCCOA framework. In the littoral combat zone, reliance and tactical use of the terrain changes over time as technology advances. At Elizabeth City, tactical reliance on Fort Cobb was a heavy component for the Confederate defense. During World War II, reliance on airfields, scouting ahead of fleets from forward bases may have relayed crucial intelligence information on enemy fleets. These terrain features figure into the METT-T/KOCCOA frameworks and represent a vital element in how the terrain can affect naval war. These changes in how the landscape is used tactically over time would present themselves as METT-T or KOCCOA studies are viewed in chronological order.

For pure quantification of archaeological data, looking at the weapons systems and how they change over time as technology advances would also show changes in tactical change. The use of ships with a single bow and stern gun versus the traditional broadside arrangement and the increased use of the former can be seen at Elizabeth City. The increased mobility of a steamer meant that if a gun was forward and rear facing on the centerline of the ship, wherever the bow

or stern could be pointed would be a firing lane as opposed to having to bring a ship parallel with a target to bring arms to bear. The majority of the ships that participated in the engagement were not armed with broadside guns. *Black Warrior* and *Valley City* were the only two vessels armed in the traditional sense. Other vessels such as *Commodore Perry*, had additional guns protecting their flanks, however, this arrangement of artillery is not the same as the traditional broadside, where all guns except for a possible light bow or stern chaser are arranged along the vessels length.

It is not only the arrangement of the guns aboard ships that can be considered in this weapons quantification. Looking at the ship as an artifact and the actual armament of a ship pertains to this as well. As technology progressed, so did weapons systems and ships became more specialized. One ship may only carry rockets, while another may be armed with four large caliber turrets. Within a fleet, each ship has its tactical role, and as tactics change, the types of ships, their specializations, and weapons systems will change accordingly. These changes will be present in the archaeological record for quantification in typologies of specialized ships. The typologies may then be considered in an officer's deployment of the vessels in the METT-T, KOCOA, and MNTT frameworks.

#### Shortcomings and Future Research Possibilities

The shortcomings MNTT are stated above in the discussion of its use in examining naval battlefields and will not be repeated here. Instead, this section will discuss the shortcomings encountered with the methodology and data collection for the present study. The most significant shortcoming of the present study concerns itself with the lane spacing during the remote sensing survey. While the self-funded nature of the survey limited the time that could be spent on site, the fact remains that several smaller magnetometer targets that could have been spent ordnance

could have been missed. The survey needs to be regarded as sufficient for the purpose of this study, but as a whole, incomplete.

Similarly, the magnetometer towfish may have completely missed any cluster of iron fasteners or fittings that may be remaining from CSS *Sea Bird*. Lane spacing was 40 meters, and *Sea Bird* was just over 40 meters in length. Thus, if a cluster of iron associated with the wreck was found on the periphery of a line, chances are the towfish missed it. Finding *Sea Bird* would not only have helped make inferences on the Confederate battle formation and its near exact position in the river for GIS interpretative models, but would have been a significant find to report to the North Carolina Underwater Archaeology Branch for further investigation and management. Had *Sea Bird* been found, the final shipwreck associated with the Battle of Elizabeth City would have been accounted for.

A final shortcoming involves the *pBlock* modeling. While a 32-pound solid round shot can be said to be representative of the ordnance used during the battle, there were actually several different cannons used. Without sufficient data to model these other ordnance pieces, the study had to eliminate potential targets, those in the 76-100 gamma strength range. Some of these pieces may have been the 20-pound, 30-pound, or even 100-pound artillery projectiles used by the Union.

Even with the shortcomings of the present study, several future potential research possibilities arise. Starting with the Battle of Elizabeth City, a complete survey done of both survey zones presented in Figure 24 would define the battlefield perimeters with a high degree of certainty, as the Union advance and primary engagement zones could then be mapped out as a whole battlefield. The survey area could even be extended closer to the city in an effort to map out the retreat of CSS *Appomattox* and its pursuit by USS *Underwriter*. As it is yet undiscovered,

the research potential to relocate and document the wreck of CSS *Sea Bird* is still an exciting possibility. Several of Benjamin Terry's Keyport, New Jersey, built steamers participated in the Civil War, four of them in the early stages: CSS *Winslow* (*J.E. Coffee*), CSS *Sea Bird*, USS *I.N. Seymour* and USS *Ceres*. It is ironic that at Elizabeth City, *Sea Bird* fought against two ships from the same shipyard. Both *Winslow* and *Sea Bird* sank in North Carolina. Either wreck could offer answers to questions about Terry's construction methods or the formation of the North Carolina Navy before it was absorbed into the Confederate States Navy. Concerning any further archaeology of Fort Cobb, unfortunately, due to housing developments on Cobb's Point, little to no further research can be done on the remains of the fort. Landscaping and grading measures from the 1960s onwards have probably destroyed what remains were present.

Finally, there is a wealth of future research possibilities regarding the use of MNTT as a theoretical framework to examine naval battles. The Battle of Elizabeth City represents only one example of fleet-on-fleet action in a specific period. The next step in testing its validity is to test it in several battles over time and different environments. Major battles and minor battles alike would need to be studied from this approach. As NDP-1 was developed by the United States Navy, battles examined with this approach would have to be relegated to when the United States Navy was formed, although an argument could be made for examining colonial navies. Nonetheless, periods studied could include engagements during the Age of Sail, the early steam-driven navies, more battles of the Civil War, the Spanish- American War, World Wars I and II, along with the Korean and Vietnamese Conflicts. This allows the approach to be applied to battles that occurred not only on two-dimensional plane, but within a three-dimensional battle space as submarine and aerial warfare emerge in naval engagements as well.

Different environments where engagements took place in, such as rivers, littoral regions,

and blue water would need to be examined thoroughly in order to understand when MNTT needs to be combined with KOCOA and when it could stand alone, if at all. Various types of operations must be explored such as fleet-on-fleet action, amphibious assaults, and missions of operational support. Questions regarding the nature of two individual ships engaging each other such as in commerce raiding and whether or not MNTT could be applied successfully to such minor engagements could be asked and explored. Finally, research on the differences between government naval vessels and privateers and if MNTT could be applied to the latter should be attempted.

In conclusion, the Battle of Elizabeth City represents an engagement that in and of itself was a minor victory, but was important in the larger context of the goals and objectives of the Burnside Expedition. This study had made great strides in creating a narrative for the battle, but additional research is needed in order to gain a complete understanding of the battle. Continued archaeological survey could add valuable information to the battle narrative. In the case of the present study, the battle offered the ability to apply new approaches to assess purely naval engagements and hopefully, this will influence more research on the subject. As for the Battle of Elizabeth City, both the Union bravery of sailing directly into the Confederate fire waiting for the orders to strike and the ingenuity of the Confederate defense deserve to be told more often. It is hoped that this battle will begin to be told as the true engagement that it was and not a minor skirmish overshadowed by the Battle of Roanoke Island as it has been in the past.

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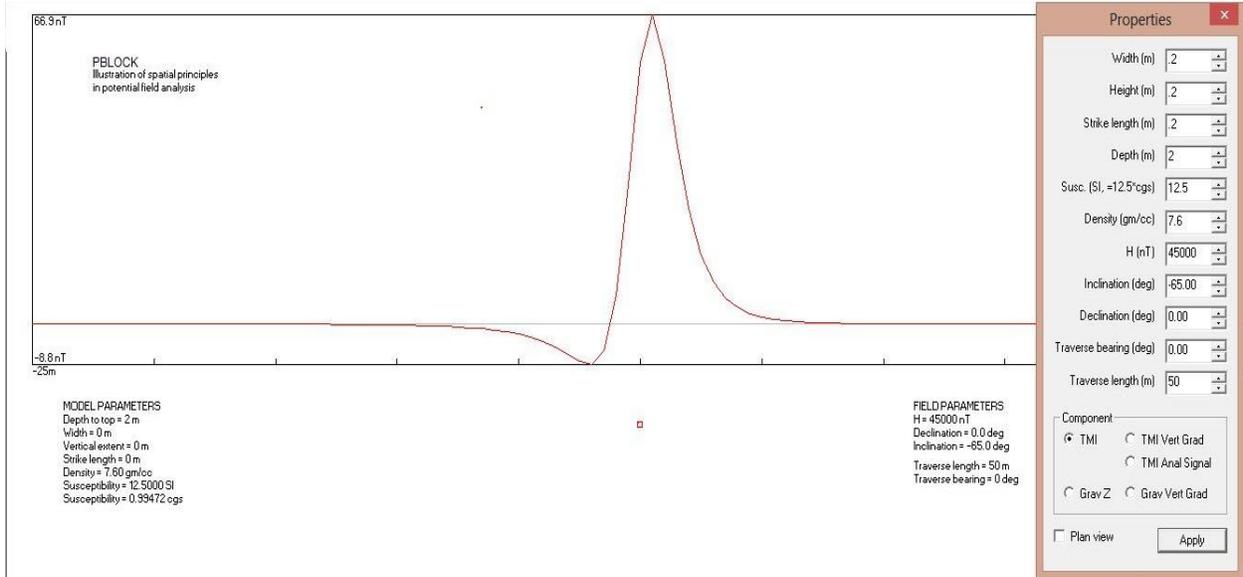
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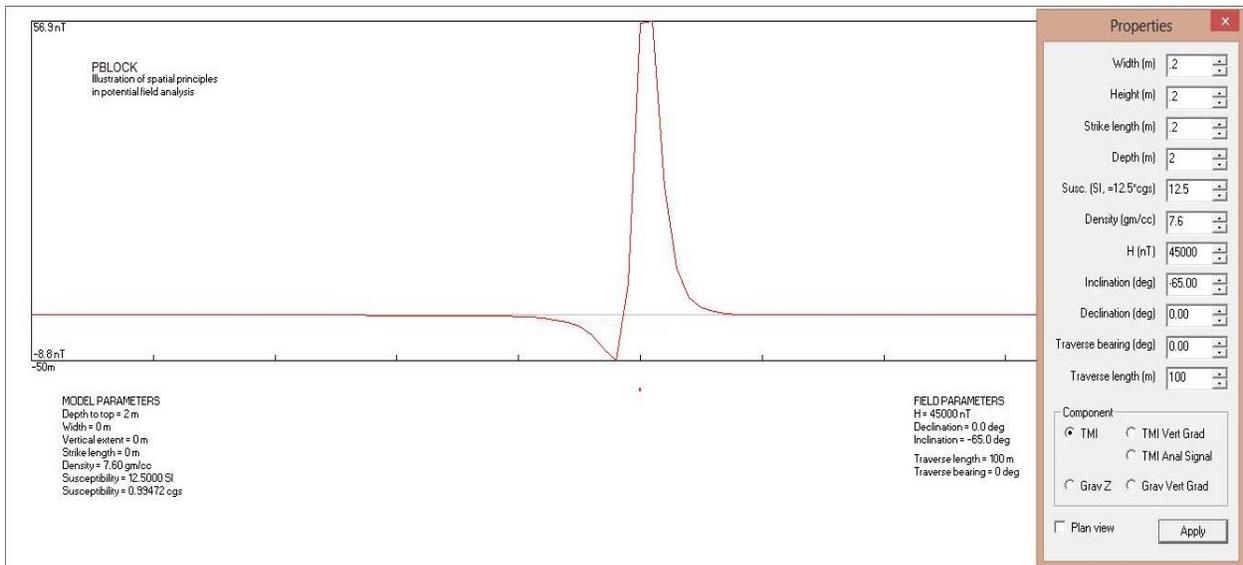
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# Appendix A: Magnetometer Models

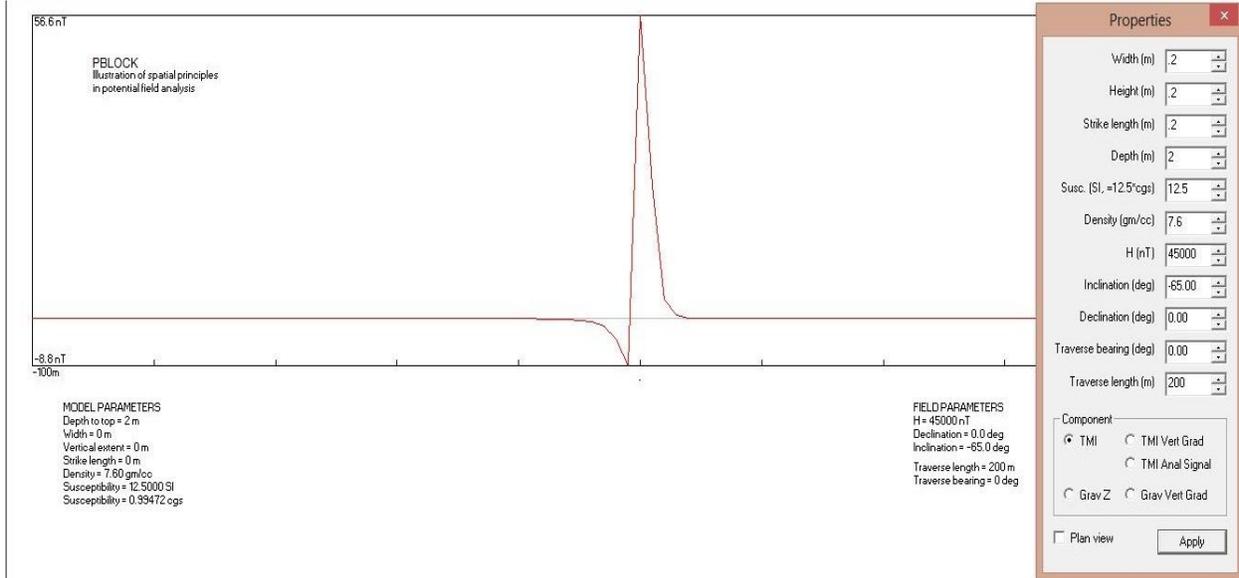
## Model 1:



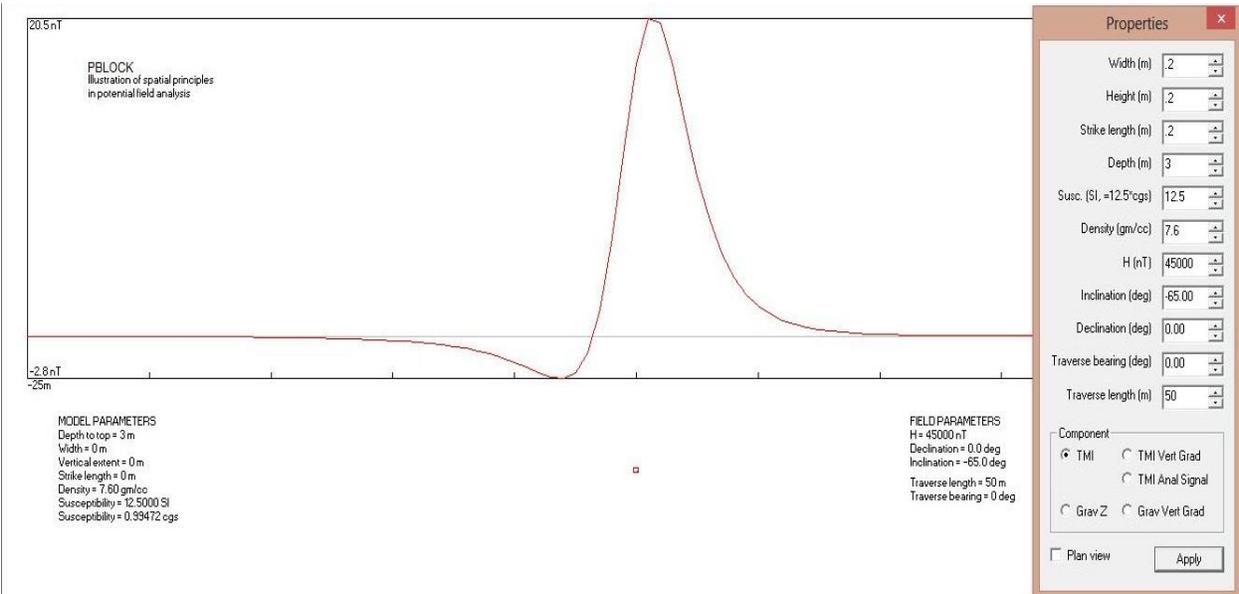
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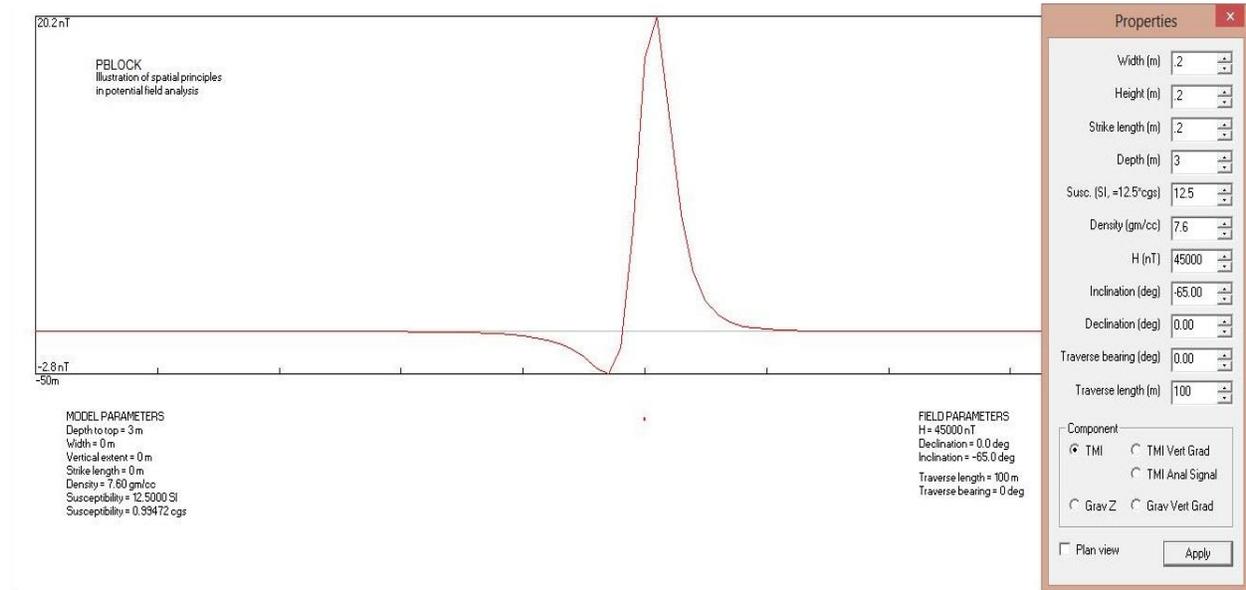
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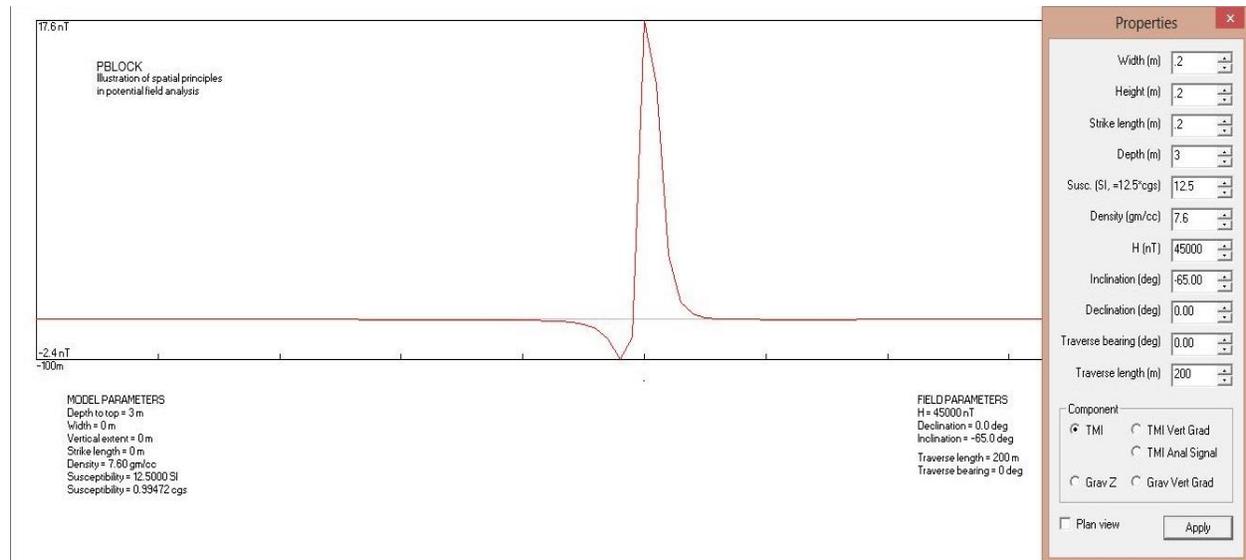
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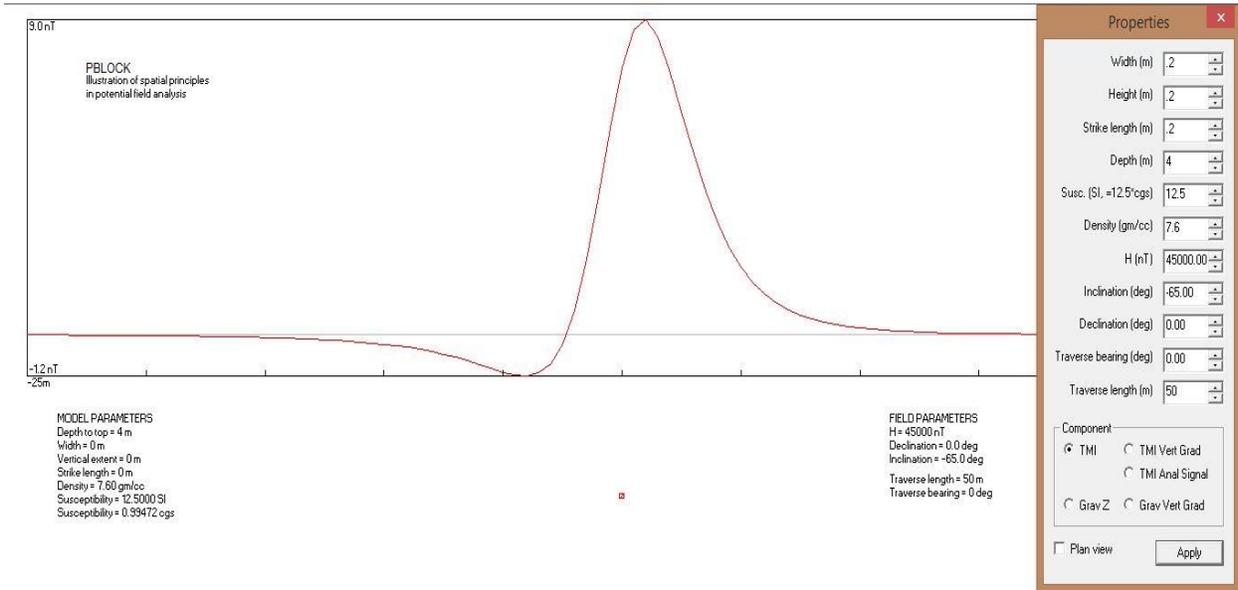
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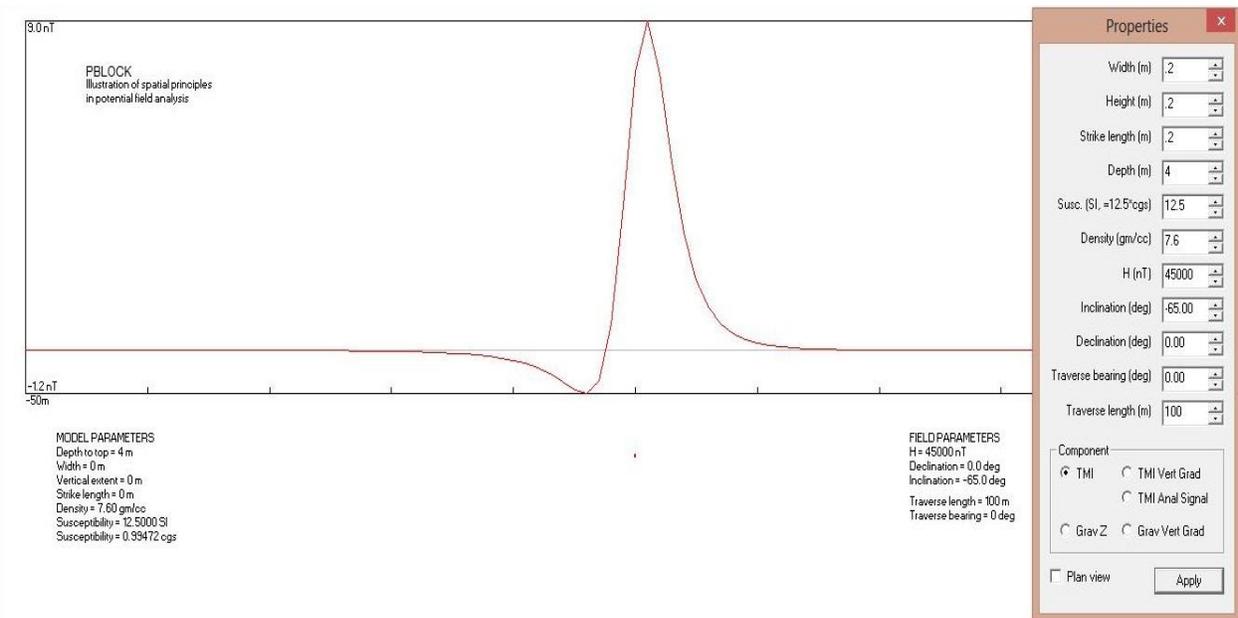
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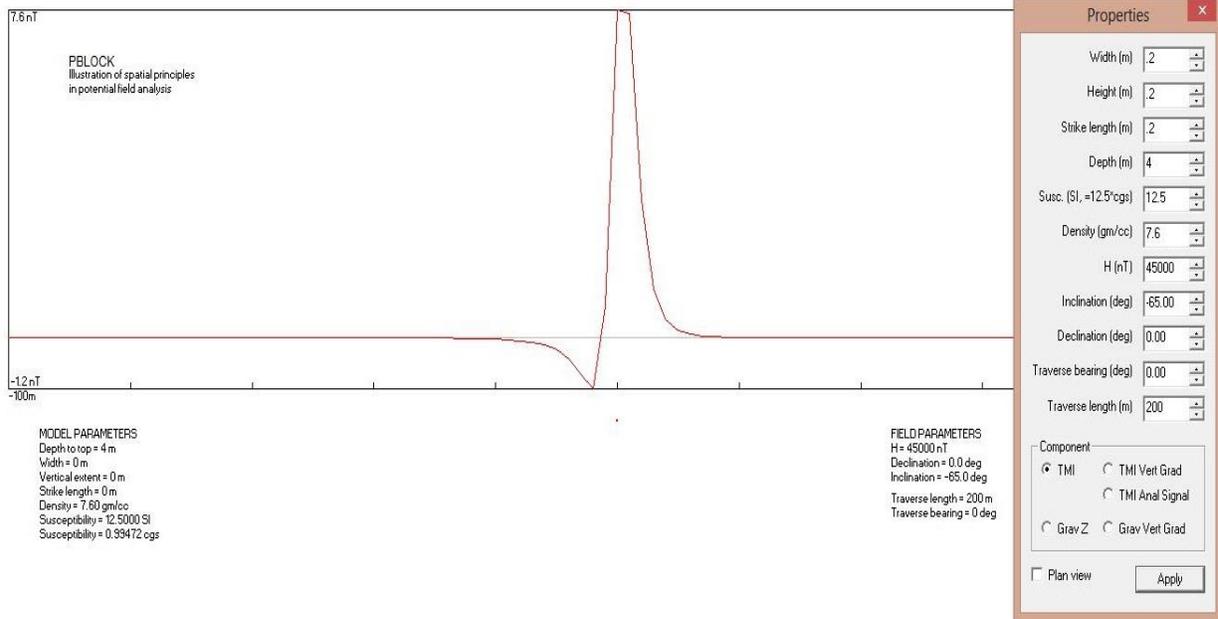
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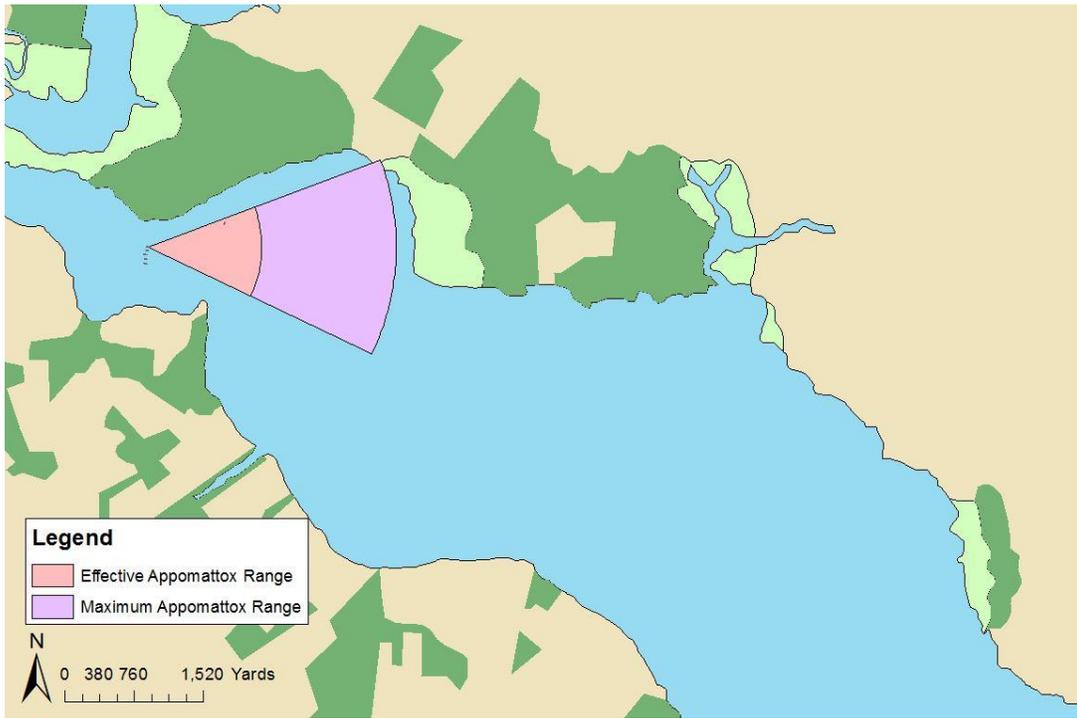
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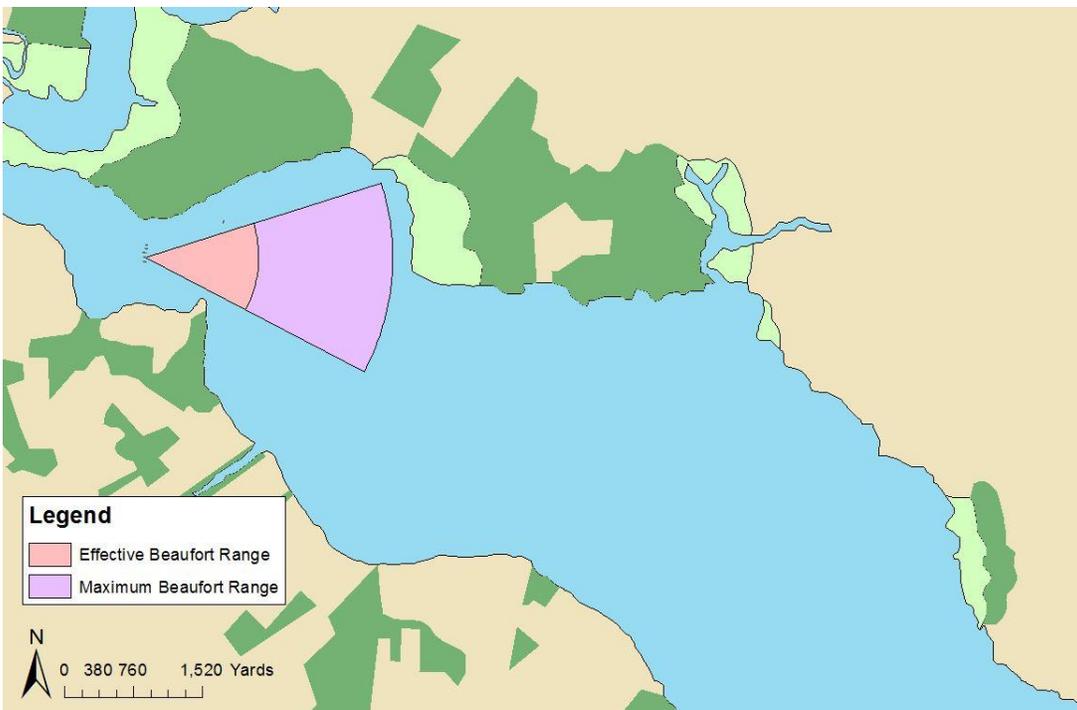
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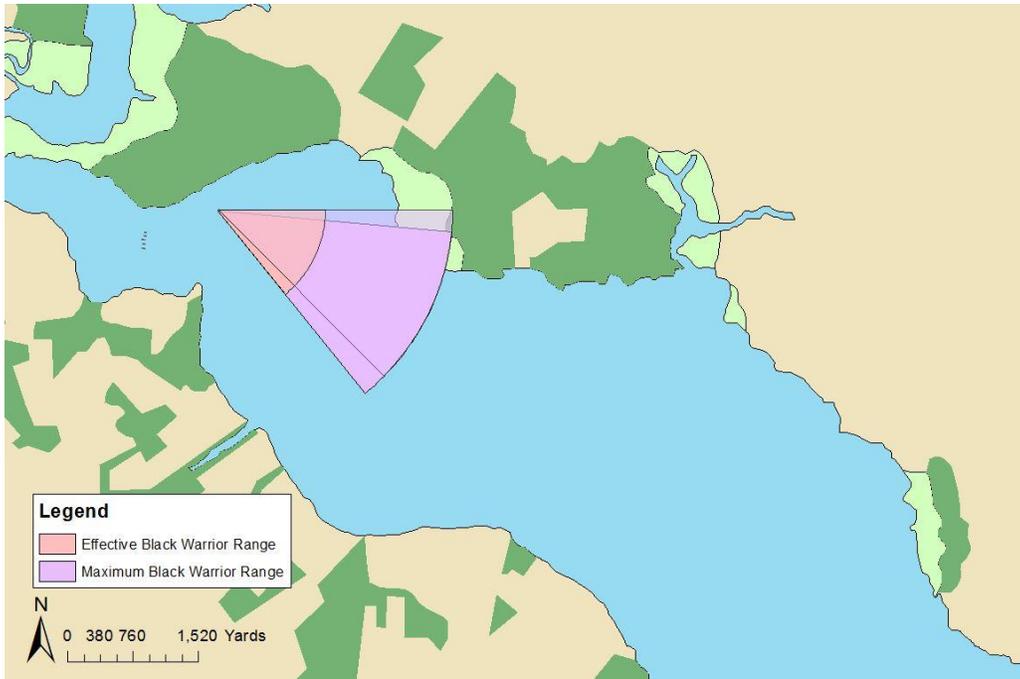
## Appendix B: Individual Ship Fields of Fire



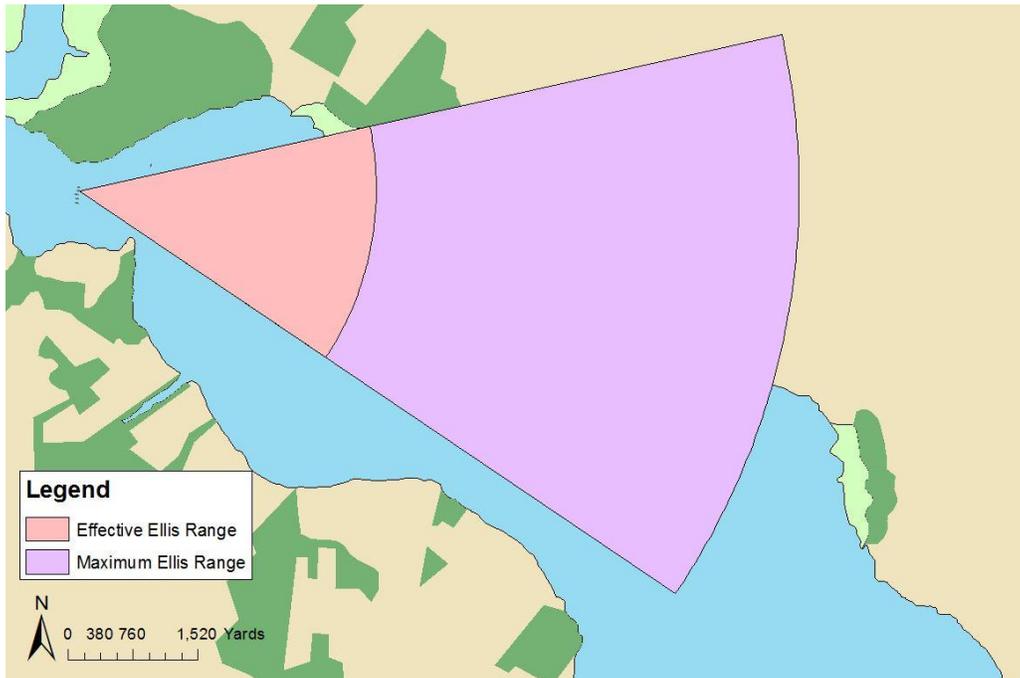
CSS *Appomattox* Field of Fire (By Adam Parker)



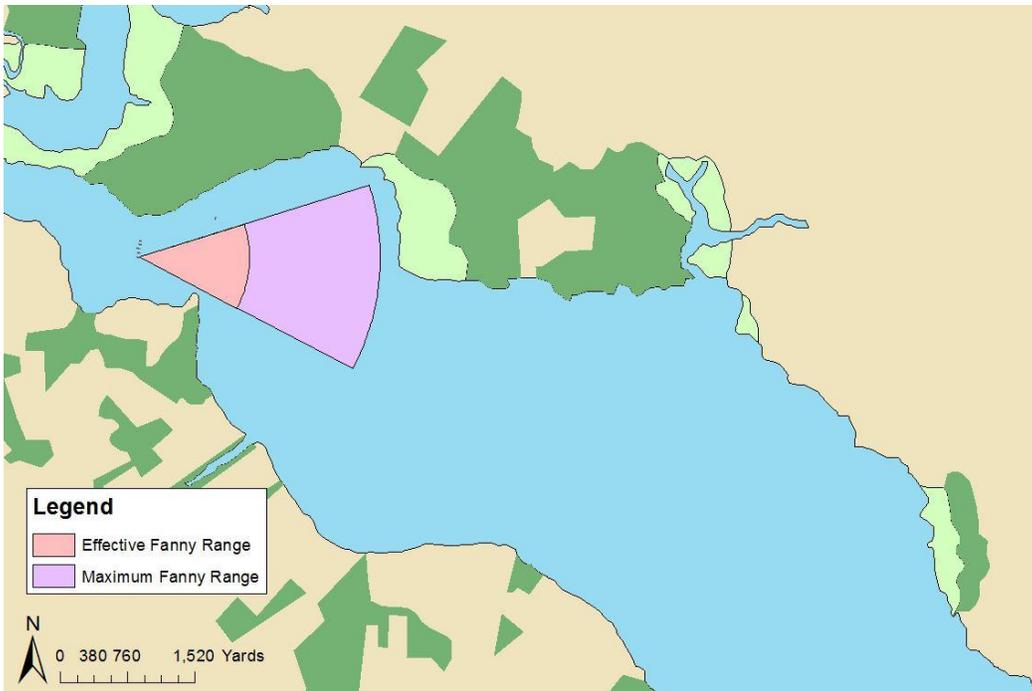
CSS *Beaufort* Field of Fire (By Adam Parker)



CSS *Black Warrior* Field of Fire (By Adam Parker)

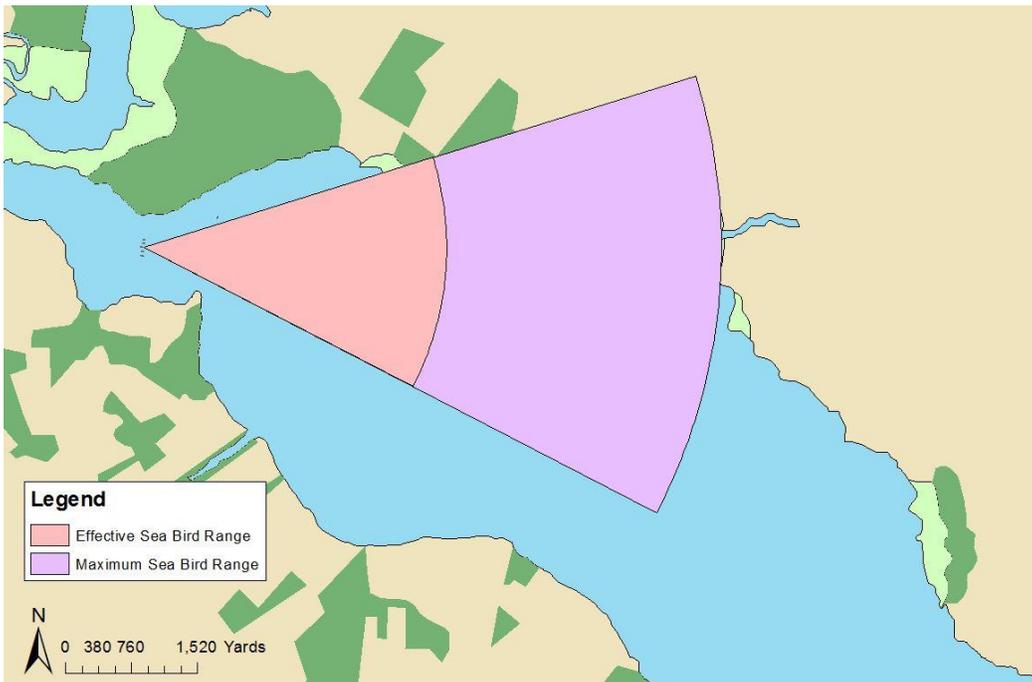


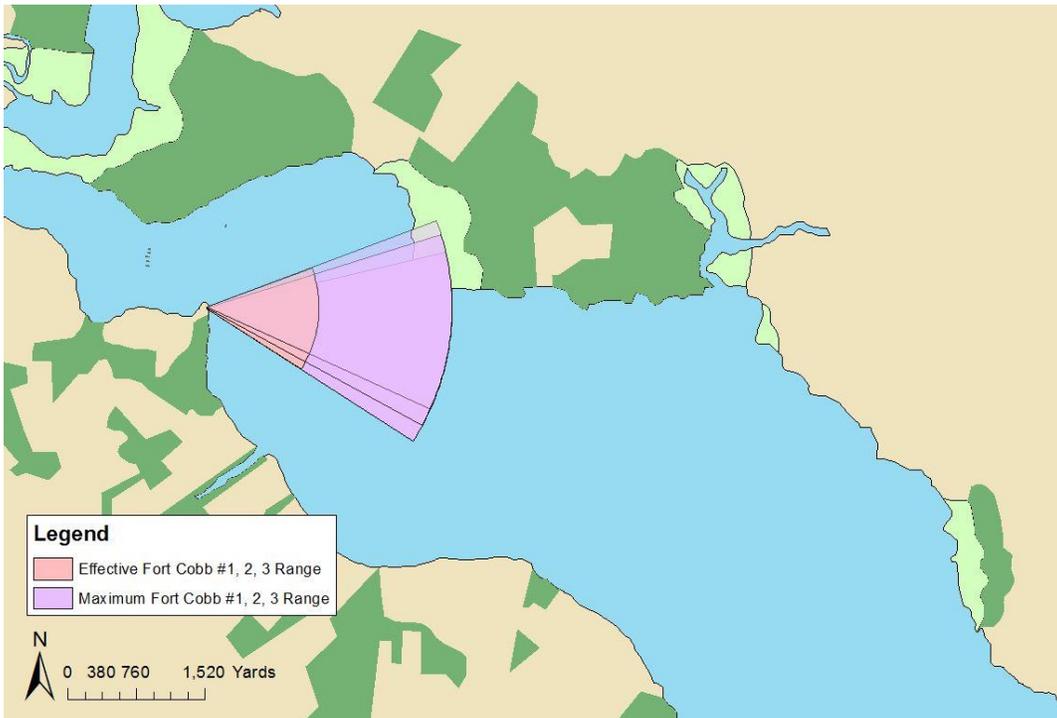
CSS *Ellis* Field of Fire (By Adam Parker)



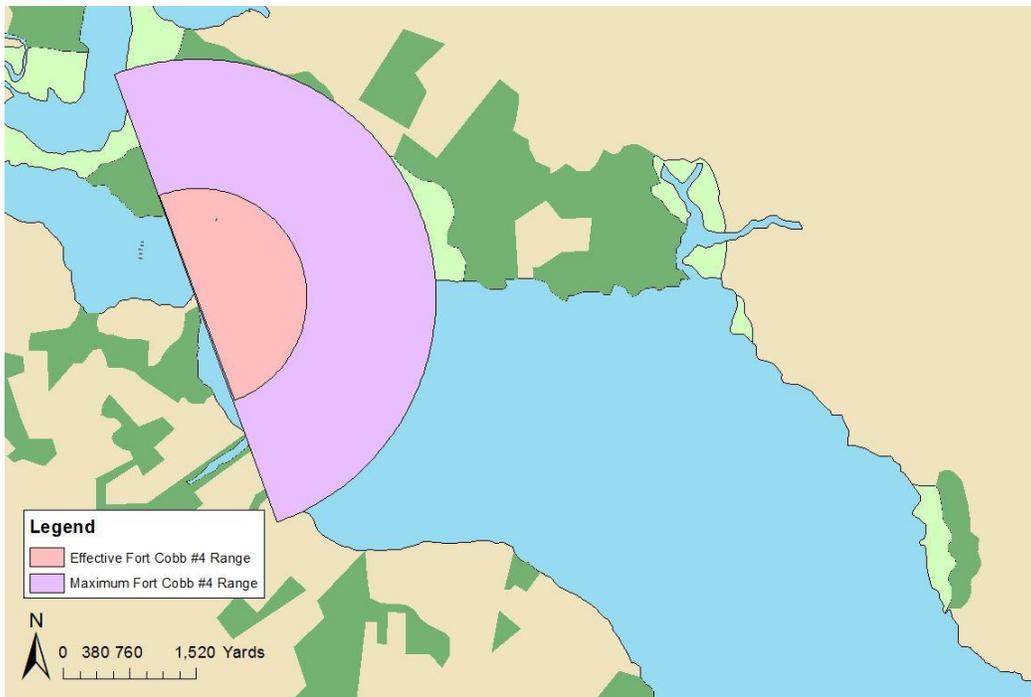
CSS *Fanny* Field of Fire (By Adam Parker)

CSS *Sea Bird* Field of Fire (By Adam Parker)

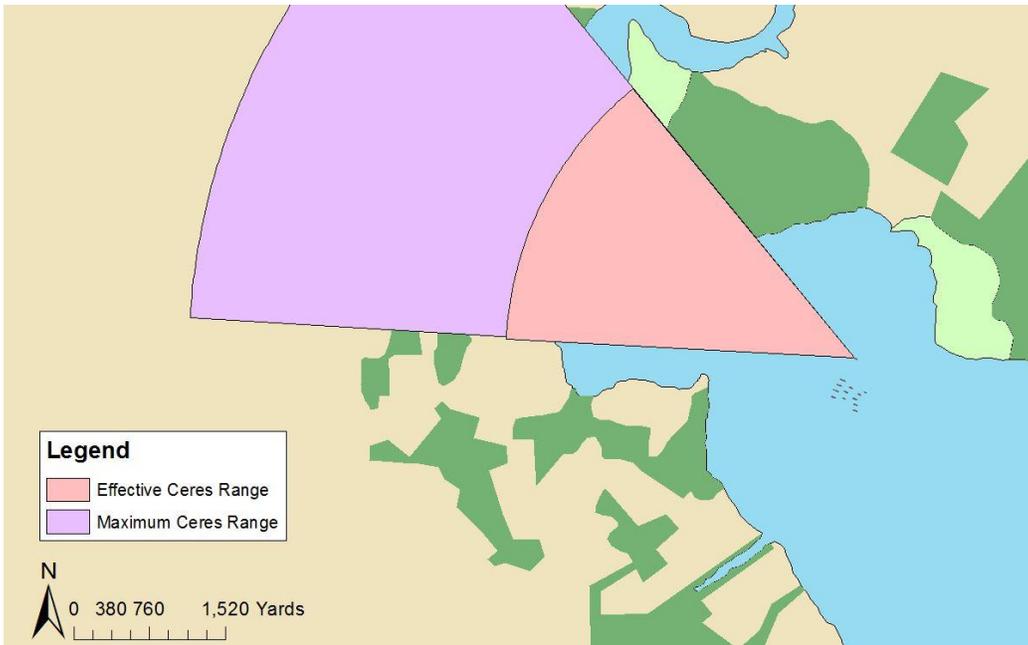




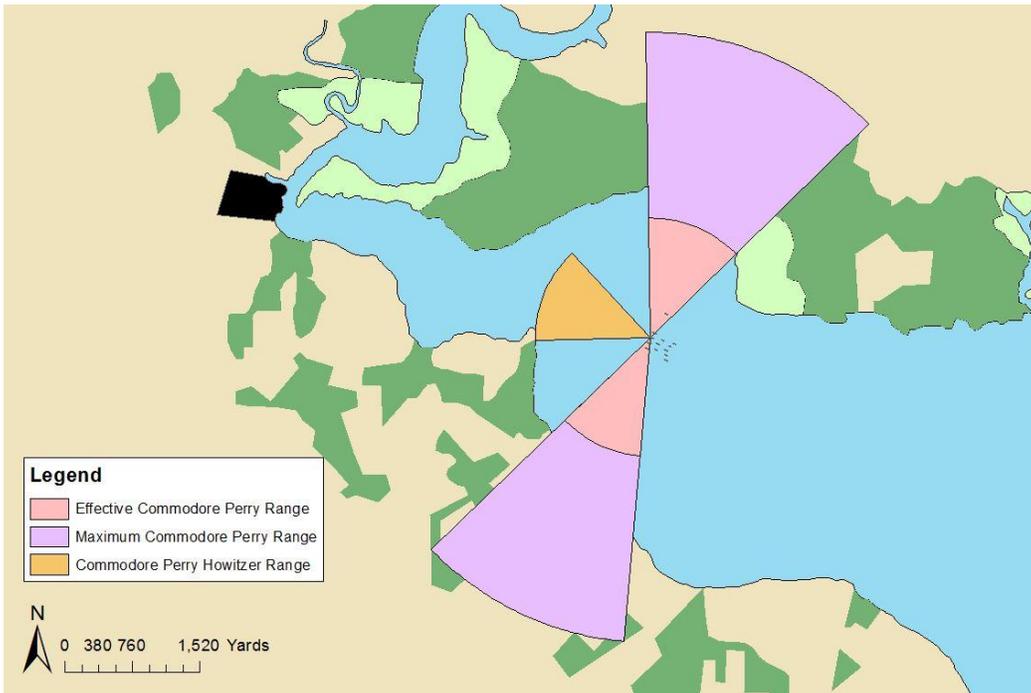
Fort Cobb Cannons 1-3 Field of Fire (By Adam Parker)



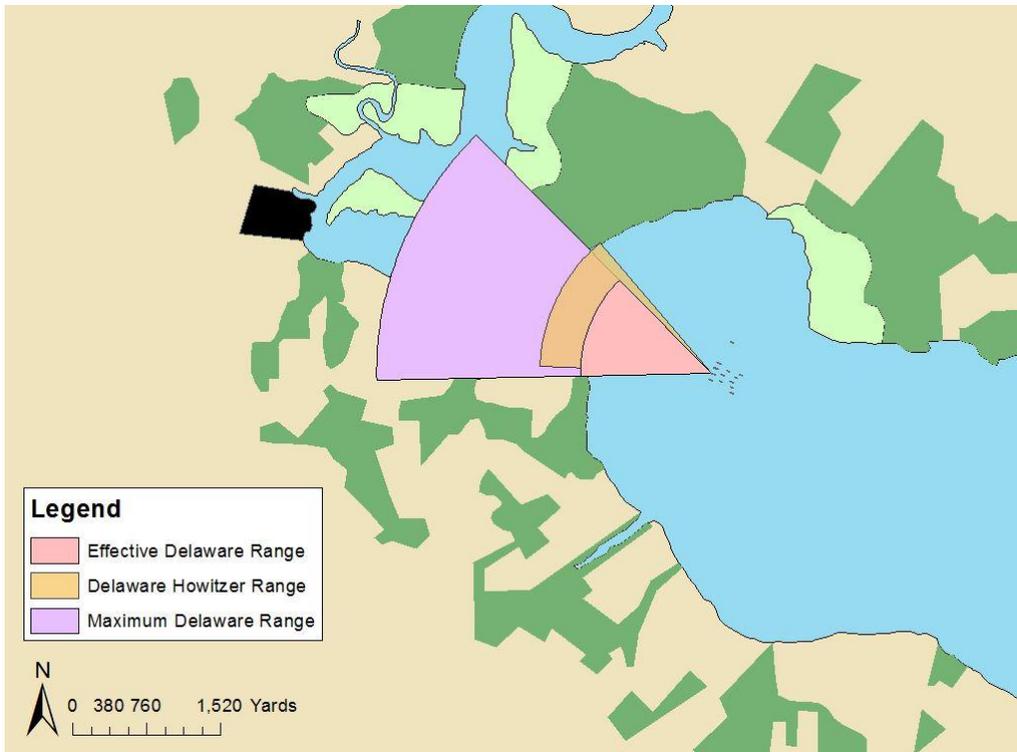
Fort Cobb Cannon 4 Field of Fire (By Adam Parker)



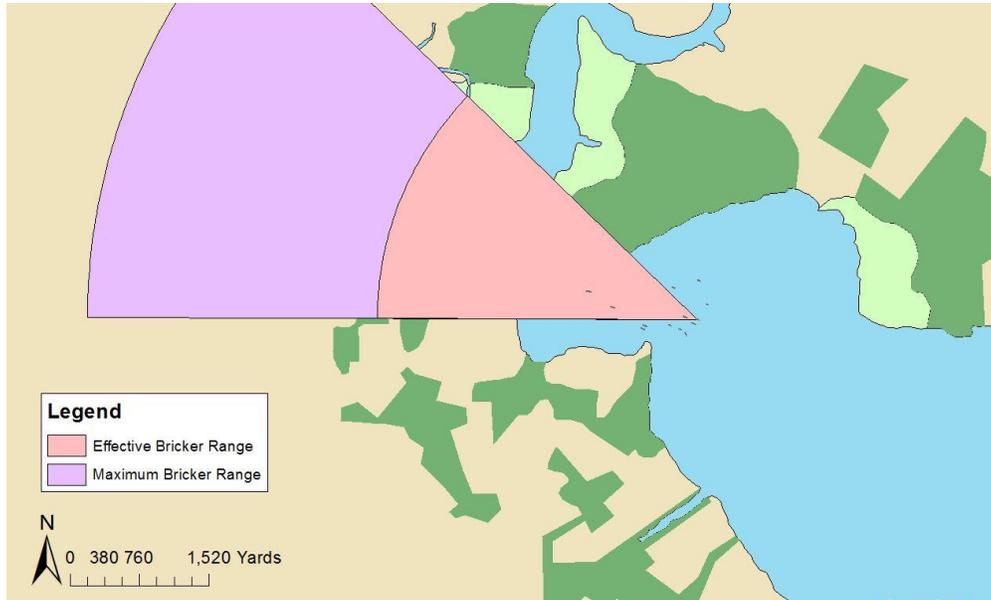
USS *Ceres* Field of Fire (note: maximum range extended beyond limits of digital landscape) (By Adam Parker)



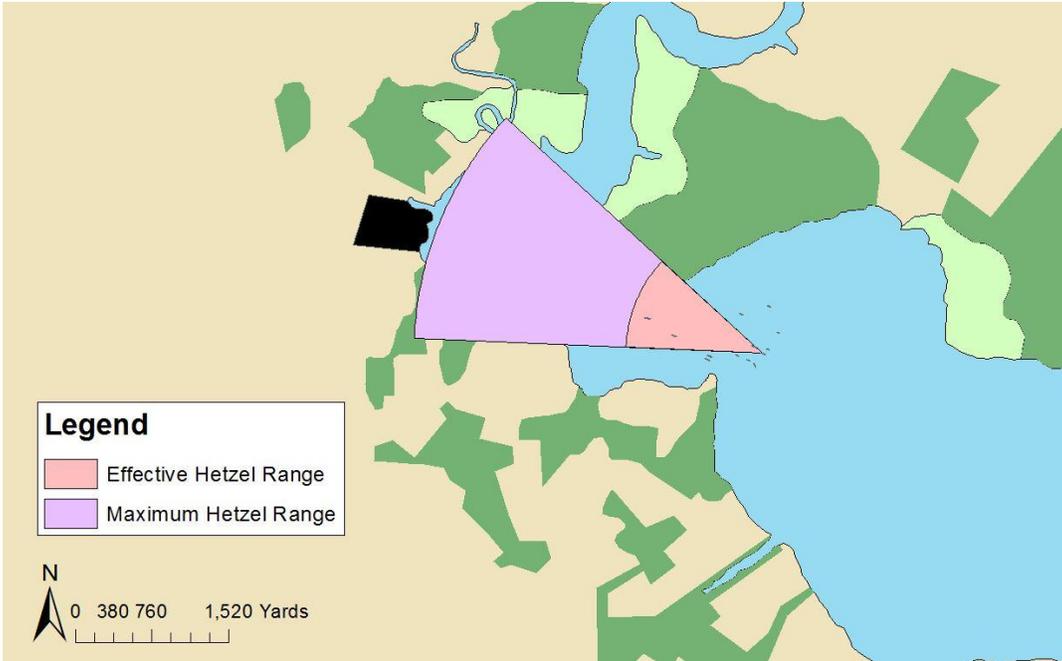
USS *Commodore Perry* Field of Fire (By Adam Parker)



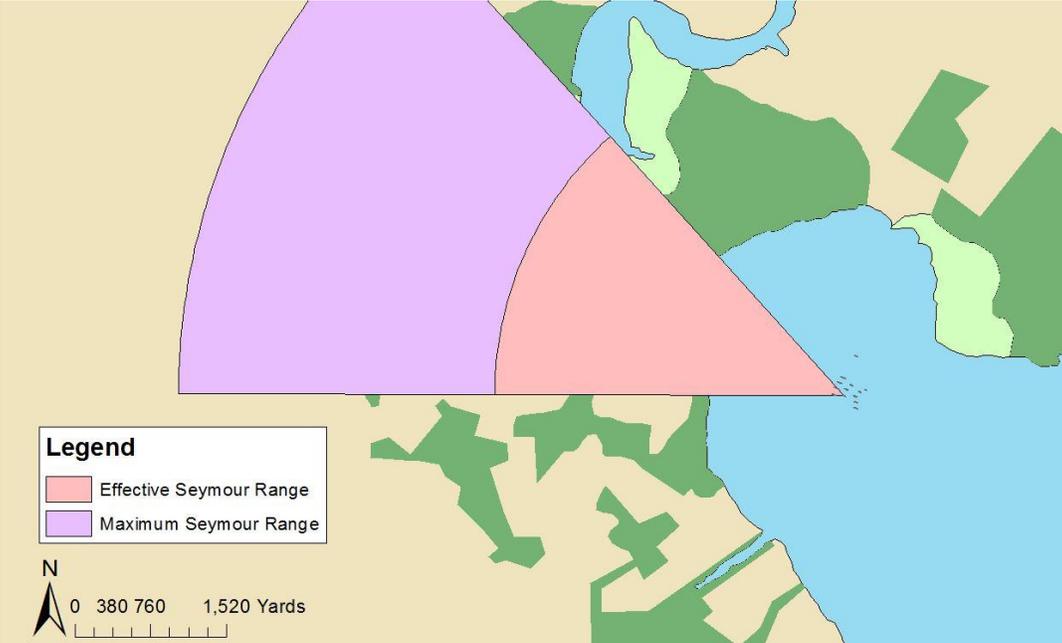
USS *Delaware* Field of Fire (By Adam Parker)



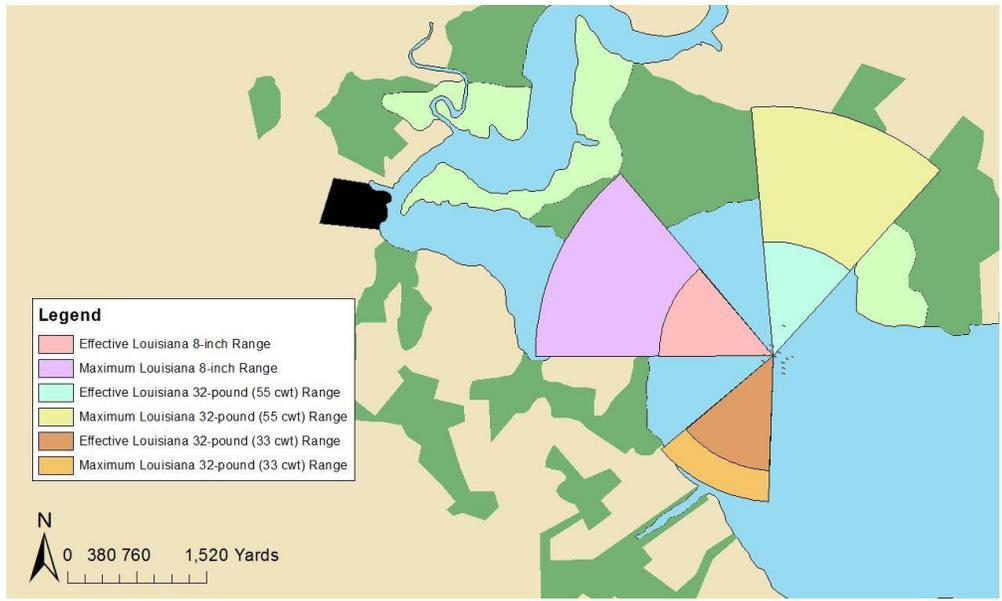
USS *Henry Bricker* Field of Fire (note: maximum range extended beyond limits of digital landscape) (By Adam Parker)



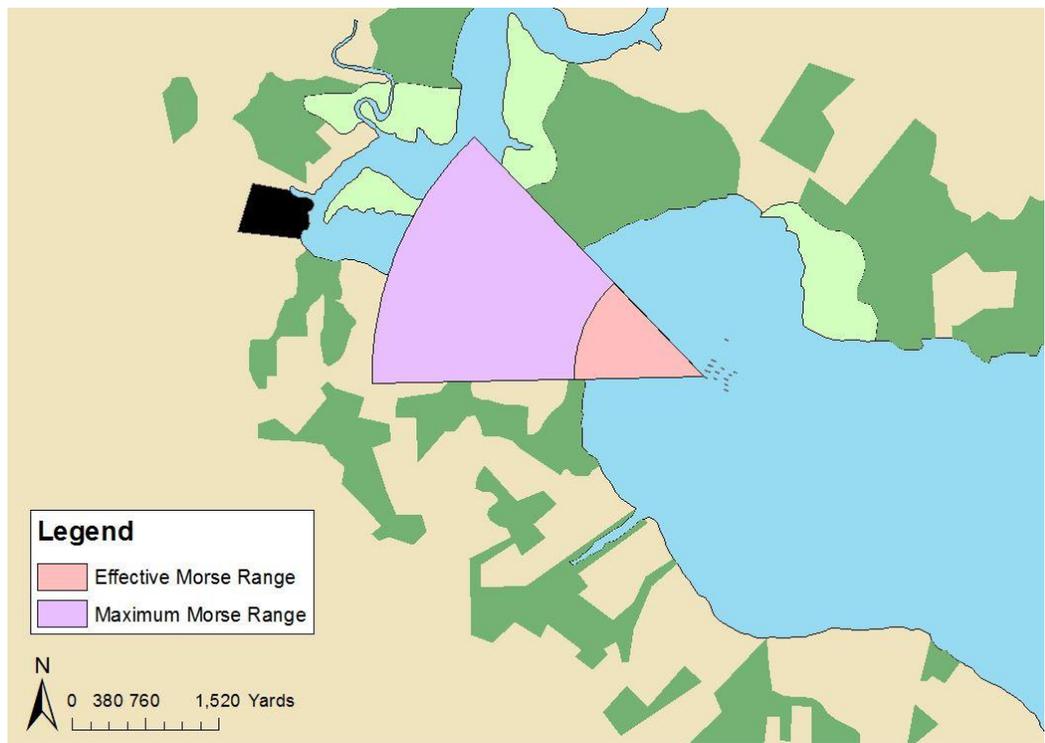
USS *Hetzel* Field of Fire (By Adam Parker)



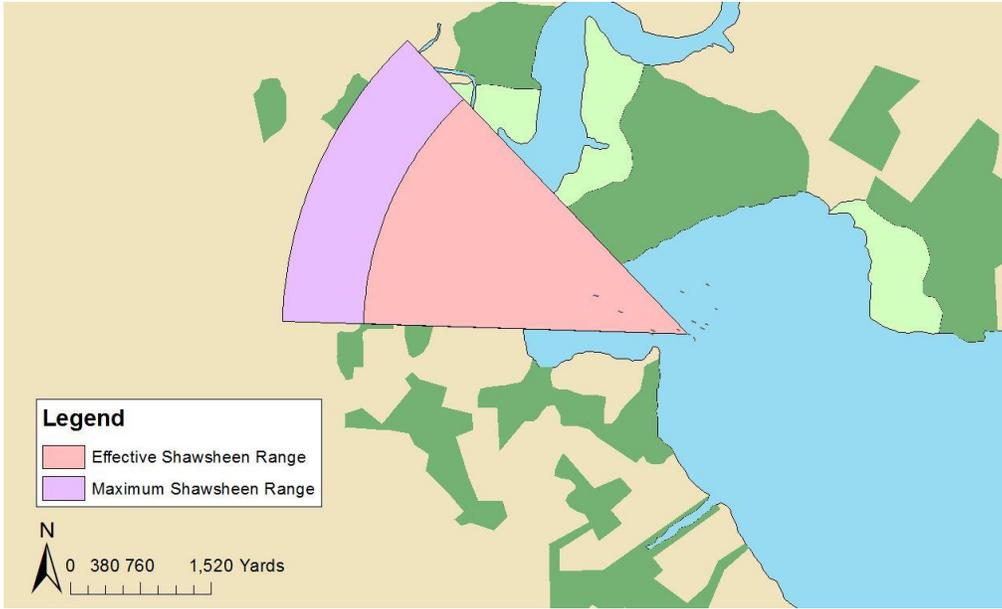
USS *I.N. Seymour* Field of Fire (By Adam Parker)



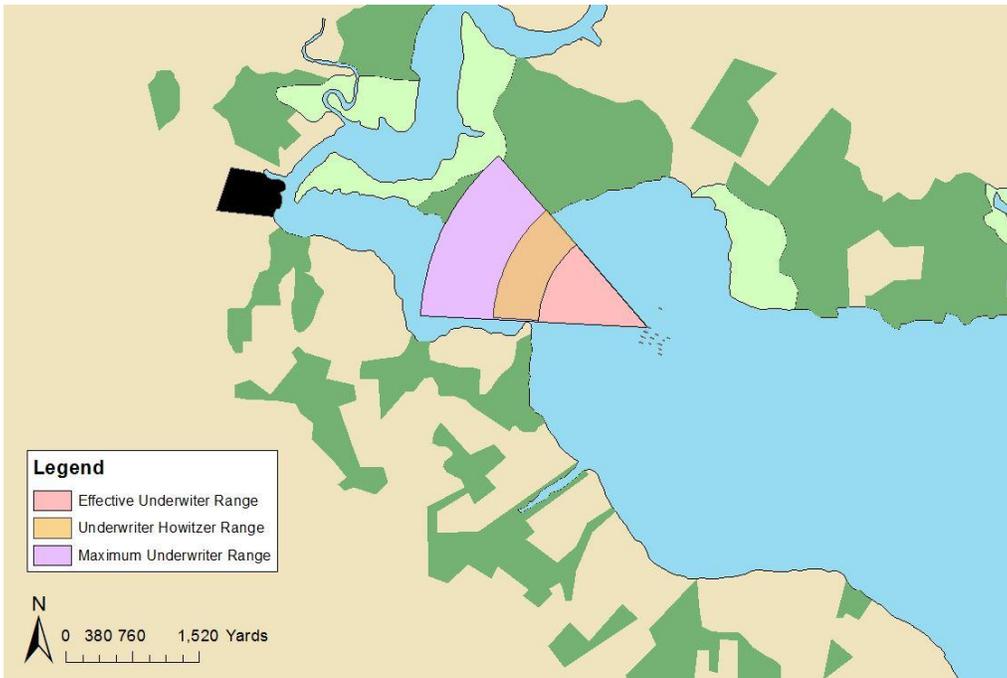
USS *Louisiana* Field of Fire (By Adam Parker)



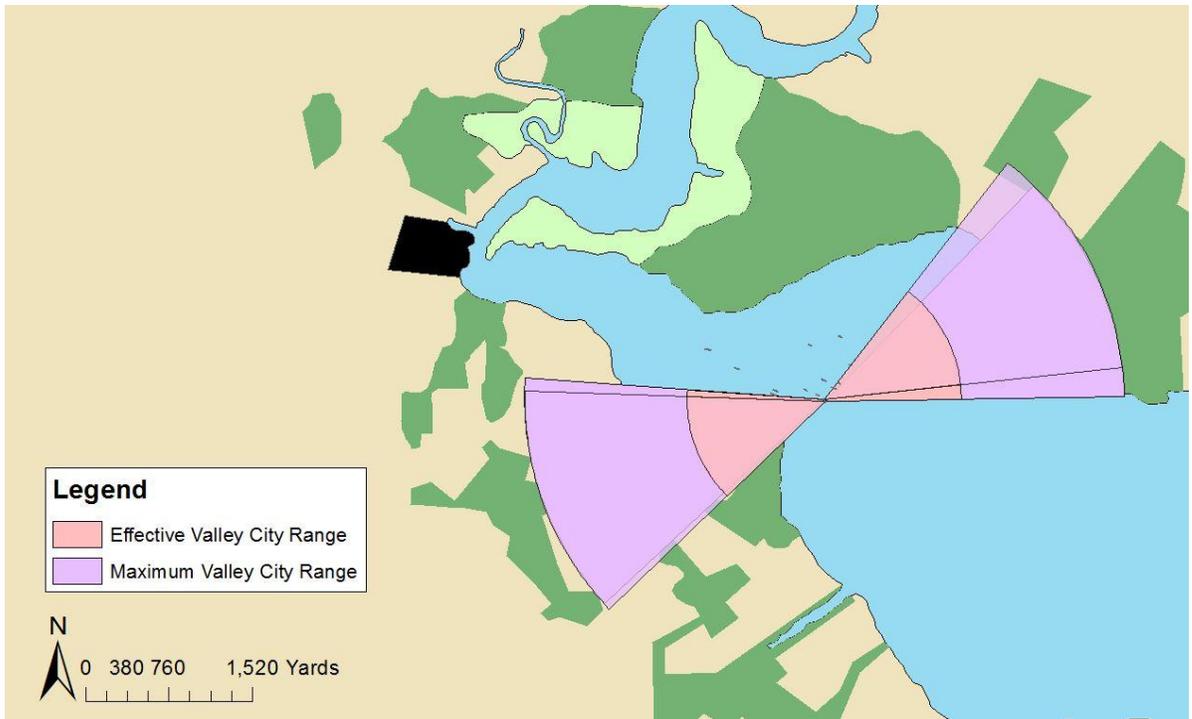
USS *Morse* Field of Fire (By Adam Parker)



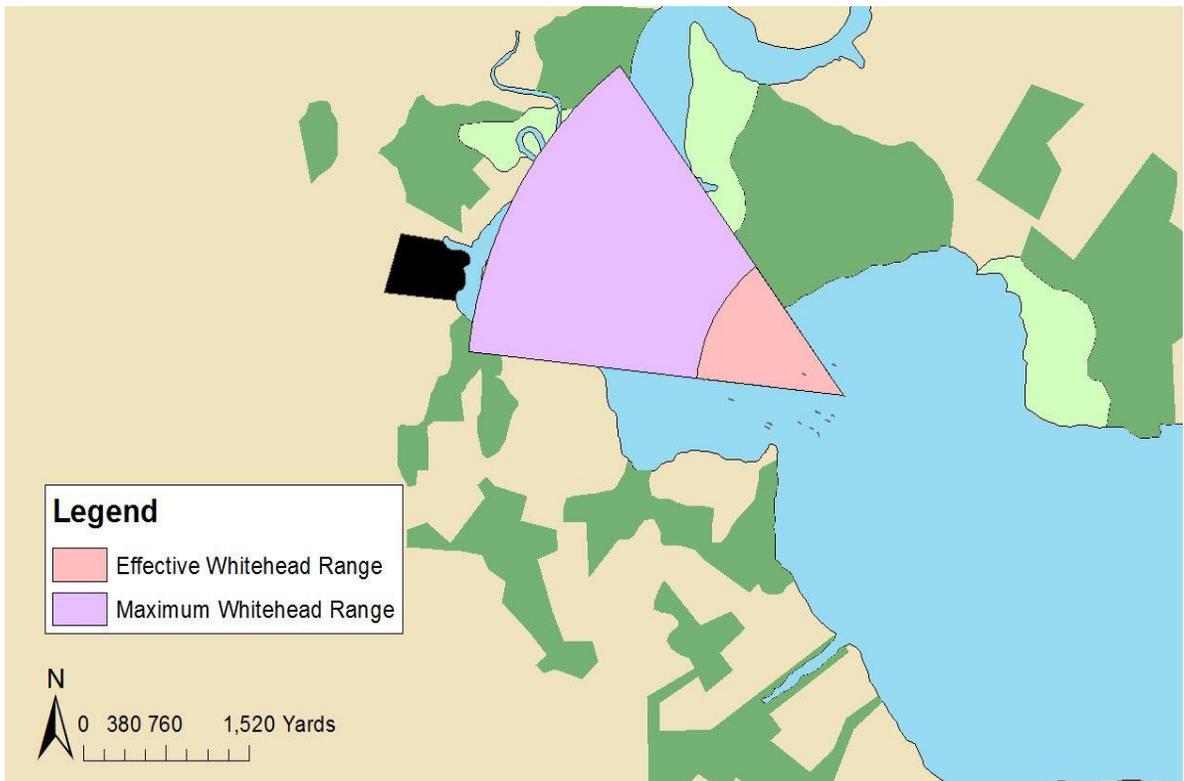
USS *Shawsheen* Field of Fire (By Adam Parker)



USS *Underwriter* Field of Fire (By Adam Parker)



USS *Valley City* Field of Fire (By Adam Parker)



USS *Whitehead* Field of Fire (By Adam Parker)