

“WAR IS WAR, AND I MUST CARRY OUT MY DUTY”:

A GEOSPATIAL AND STATISTICAL ANALYSIS OF NORTH CAROLINA’S FIRST  
WORLD WAR BATTLESCAPE

by

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Although the United States was late to enter the First World War, the waters of the nation became a battlefield from 1917 onward. Ships operating along North Carolina’s coast recurrently fell victim to the unrestricted U-boat campaign. While often forgotten in the historic record, this study follows an ongoing trend in archaeology after the conclusion of projects on the Second World War, in looking at the effects of World War One on the cultural landscape. This thesis is an historical study that compiles a record of all vessels, infrastructure, civilians, and combatants lost, damaged, or attacked in war-related incidents before, during, and after the United States entry into World War One. Primary and secondary historical sources reveal the attack and sinking locations of vessels, pinpointing the positions of potential archaeological (shipwreck) sites.

This thesis also utilizes Geographical Information System (GIS) software to render a digitized projection of the battlescape. The overall objective of this thesis is to analyze a collected historical dataset and study the points of conflict between combatants off the coast of North Carolina, and to assess geospatial and temporal trends. Ultimately the main question being pursued is, “what does the geospatial and statistical analysis of trends regarding WW1-era

infrastructure, combatants, and noncombatants inform us about the naval battlescape off the coast of North Carolina?”



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by

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## **DEDICATION**

This thesis is dedicated to my parents, Shane and Michele,  
to my siblings, Dillan and Sheri,  
and finally, my grandmothers, Janice and Helen,  
for their support, unconditional love, and encouraging my work.

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to travel all the way to North Carolina, has only fueled my ambitions and helped me through the rougher times.

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## CHAPTER ONE: INTRODUCTION

### Introduction

The Great War or the First World War as it was known at the time, quickly escalated into a violent exhibition of new and destructive technologies. During the period 1914-1917, the United States remained neutral as battles raged across Europe into different parts of the globe. Over this time, however, the relationship between the United States and the newly unified Germany became increasingly strained due to the activities of U-boat patrols in European waters. Americans had lost their lives and businesses to the submarine warfare. Tensions mounted after the sinking of the RMS *Lusitania* in 1915. Although many lives were lost this event did not inspire America to join the war. The final strike against Germany was the enacting of unrestricted submarine warfare at the beginning of 1917. As a finishing push, Kaiser Wilhelm ordered a blockade against the British Isles and any of their allies, placing his faith in the successful and highly feared force of the submarine. This declaration initiated an immediate reaction from the United States (Frothingham 1926:9). Within months Americans prepared to go to war.

United States Congress officially declared on April 6, 1917, and within a year U-boats moved into the Eastern Atlantic. Though only seven traveled from Kiel, Germany, three ventured as far as North Carolina during a destructive three-month period. The summer of 1918 became a tense and worrisome period for the merchant ships traveling the region in pursuit of making an honest living from selling the cargo they carried. A total of ten ships sank due to U-boat activity off North Carolina waters (Daniels 1920:139-140).

## Previous Research

The waters of the state of North Carolina have been studied extensively since the inception of the National Oceanic and Atmospheric Administration (NOAA)-led “Battle of the Atlantic Expeditions” in 2008. In 2010, John Wagner, a graduate of East Carolina University’s Maritime Program, produced the first thesis to emerge from the project titled, “Waves of Carnage: A Historical, Archaeological, and Geographical Study of the World War II Battle of the Atlantic in North Carolina Waters.” This study delineated the movements of combatants that constitute the World War Two battlefield for the first time. By using geospatial and quantitative analysis techniques, he was also able to render and contextualize the extent and changing nature of the battlefield off North Carolina’s coast.

The thesis completed by Wagner for the Second World War and archaeological sites in the region aided in the work of other East Carolina University (ECU) and NOAA scholars, including the theses by John C. Bright (2012), Stephen Sanchagrin (2014), Kara Fox (2015), William Sassorossi (2015), and Mitchell Freitas (2017). It was also instrumental in the completion of Richards et al.’s, “Research Design: Battle of the Atlantic Expedition 2011: The Battle of Convoy KS-520” (2011), Bright et al.’s “The Battle of the Atlantic Expedition 2011: The Battle of Convoy KS-520 (North Carolina, 15 July 1942) Final Report” (2012), and Hoyt et al.’s “Battle of the Atlantic: A Catalog of Shipwrecks off North Carolina’s Coast from the Second World War” (2018).

This burst of activity followed a similar global trend of studying the battles and combatants of the Second World War from new angles. For example, Jennifer McKinnon and Toni L. Carrell published their edited volume *Underwater Archaeology of a Pacific Battlefield: The WWII Battle of Saipan* (2015) on Second World War naval battlefields in the Pacific,

furthering theoretical and methodological approaches for battlefield archaeology. Part of the popularity of the Second World War as a subject for study is due to the present day living history within the memories of veterans and their children, as well as the sheer number of archaeological sites readily available to study worldwide.

Indeed, archaeological projects related to 20th century conflicts have primarily focused on the Second World War. Within popular history, the First World War is often forgotten as a tremendous naval battle spanning the globe that impacted an entire generation of people who participated in the conflict. This has begun to change largely through landscape-focused studies of the First World War, which emerged in the early 2000s. Examples include Peter Doyle's paper, "Geology as an interpreter of Great War Battle Sites" (2001), which looks at human impacts on the landscape, including the lasting marks of war and trenches.

Recently, there has been a resurgence of interest in the naval dimensions of the First World War in the United Kingdom. British maritime archaeologists started to explore and publish on the wreckage of World War One sites. In a notable example, Innes McCartney, a nautical archaeologist, has surveyed shipwrecks from the Battle of Jutland and U-boat remains in the English Channel (McCartney 2012a, 2012b, 2016). Alongside Britain, other European nationals and world powers gained an interest in the preservation of First World War sites. Most recently, the United Nations Educational, Scientific, and Cultural Organization or UNESCO held a conference in Bruges, Belgium on underwater cultural heritage of World War One (UNESCO 2015). Although the United States left a significantly smaller historical footprint during this era, studies on the countries participation lags. The American belief that the events of the First World War occurred "over there" on European soils ultimately impacts the scholarship surrounding this period. The U-boat invasion along the United States coastline was the first European enemy craft

to enter those waters since the War of 1812 (Clark 1929:3). Despite publications produced before and after the Great War ended, the attack on the eastern seaboard remained virtually forgotten. Recently there has been a shift in focus on the local impacts of the war over the last few years due to the centennial anniversary of important events.

### **Objectives**

To complete a thorough and informative study on such a broad and all-encompassing topic such as World War One, it is important to follow a series of goals. A first goal is to analyze a dataset of primary and secondary historical sources and points of conflict between combatants and non-combatants off the coast of North Carolina. The primary intent of this study is to focus on answering types of questions such as; what types of events occurred within the waters of North Carolina, what types of vessels are represented in the battlefield, what nations contributed to events, and the types of interactions between U-boats and other ships in the state's waters. By revealing these elements and communicating the number of events and vessels involved, and the nationalities of these watercraft, it is possible to obtain a broader understanding of the battle. This leads to a second goal of rendering several digitized maps of the historic and archaeological battlescape. To provide the necessary information about the events occurring within North Carolina waters and to determine the battlefield boundaries, a series of primary and secondary research questions were generated and used to guide the research of this thesis.

### **Research Questions**

There are many sensational stories associated with this period that while fascinating, distract from the overall narrative. Detailed research questions helped keep the study focused on historic

events and the geographic extent of those interactions. Ultimately, this thesis will answer a primary research question, with the assistance of a series of connected secondary questions:

*Primary*

- What does the geospatial and statistical analysis of trends regarding First World War-era infrastructure, combatants, and noncombatants inform us about the naval battlescape off the coast of North Carolina?

*Secondary*

- What were the main interactions between combatants off the coast of North Carolina?
  - How many vessels were lost or damaged due to U-boat attacks?
  - How many were lost or damaged due to mine laying?
  - What were the nationalities of the vessels that were lost or damaged in 1918?
  - What were the types of vessels that were lost or damaged from in 1918?
- What are the primary interactions between the Allied and Central powers off the Coast of North Carolina?
  - What were the roles of United States combatants and infrastructure?
  - What were the roles of noncombatants, neutral nations, and civilian agents in the war?
  - What were the roles of German combatants?
- Are there aspects of the North Carolina seascape that contributed to specific and frequent areas of conflict?

- Can the accuracy of coordinates relayed in distress calls, German sinking reports, and Government reports after the war be verified and extrapolated to test the accuracy of the possible whereabouts of vessels still not located?
- Can these boundaries be utilized for future management plans to locate and protect the material culture of World War One?

By concentrating on these research questions and allowing them to guide the study, it is possible to maintain focus on the waters of North Carolina. Another question that should also be addressed, however, is why the waters of North Carolina were important to the overall conflict waged off the United States and serves as a distinction from other geographic areas.

### **Importance**

This thesis focuses on the reevaluation and rediscovery of World War One sites within the region. With the localized shift in focus from the Battle of the Atlantic to older sites and the upcoming one-hundred-year anniversary of important historic events off the coast, it is now more imperative than ever to discuss the impact of the First World War on North Carolina's history. Because of the extent and the length of the battle, government censorship, and the larger impact of the war following the conflict, this era remains largely ignored within local history. This thesis hopes to spark conversations and a revitalization of the past within the present-day community, as well as, to educate and inspire further research on the topic or related areas of study. Most importantly, this study hopes to encourage the management and conservation of the archaeological sites as the information provided by this thesis may help in the discovery of the remaining shipwrecks.

As of today, of the ten known ships sunk during the war, eight vessels are presently unaccounted for. Locational error is possible from the positions given upon sinking and in historic reports, as well as, influence from the elements and shifting sediment. Another issue surrounding the ships is their present state after being submerged for almost one hundred years, as there is no known rate of deterioration nor level of protection against natural and cultural elements (such as hurricanes and looters). The thesis presents a challenge to those willing to participate in the preservation of underwater cultural heritage that has long since been overdue. While North Carolina was a small geographic boundary in a global conflict, these sites represent an opportunity for archaeologists to rediscover shipwrecks in other parts of United States waters and extend protections to those locations. Alongside the call to managers, the other intended element of this study is the rediscovery of North Carolina's lost history during the war and to remind the public of the events that took place within their own neighborhood not so long ago. Multiple stakeholders in the future preservation of these sites must be involved in the hopeful management of these vessels. Franklin H. Price (2014) in his paper, "Florida's Underwater Archaeological Preserves: Public Participation as an Approach to Submerged Heritage Management," states, "Cultural resource managers, archaeologists, divers, and the general public are all stakeholders in the broader discussion about the management of submerged shipwrecks" (Price 2014:227). This thesis accounts for the population most impacted by the future locating and protection of these ships.

Most importantly, this study is the first of its kind to consider the impact of the First World War within the geographic region and the collect an inventory of spatial and historic events. Like Wagner who impacted the scholarship on the Battle of the Atlantic, it is the authors intent and aspiration for future studies to follow on this period in history. This is a singular and

highly specific subset in a war running from Nova Scotia to Cape Hatteras (Daniels 1920:139-140). There are several avenues for future research across the eastern United States and with much larger datasets to mirror the geospatial analysis and methodologies explored within this work.

### **Thesis Structure**

Because of the broad nature of this study, different avenues of acquiring and producing data were utilized. This included archival research at multiple locations across state boundaries, analysis of multiple historic documents, and the use of computer software to fully conceptualize the First World War battlescape. Following this short introduction, Chapter Two, Generalist Theory and Thinking About the Battlefield, details the historic academic and theoretical trends that serve as the foundation of this study. Trends ranging from battlefield archaeology and generalist approaches inform the reader regarding the framework of following chapters. Chapter Three, Methodology, entails the processes undergone in the completion of this thesis, starting with the different archival repositories accessed, as well as, the use of GIS in illustrating and analyzing the battlefield.

Chapter Four, The U-Boat Menace, captures the historical details of the First World War and chronicles the sequence of events that took place nearly one hundred years ago. This chapter reveals major historical components of the battlefield and ultimately reveals the rise and fall of U-boat warfare off America over the period from July 1916 to September 1918. This background history provides the basic framework for the analyses of the following chapters.

Chapter Five, Understanding the Battlefield, fully conceptualizes the previously explored data into basic maps of the interactions between the three German submarines and their victims.

This chapter also statistically breaks down the data, highlighting the different types of engagements, the nationalities of ships involved, the success rates of attacks on vessels, and the overall losses and casualties. Although additional statistical observations could be made about the battlefield, this information provides a basis for the battlefield required to understand the spatial analyses of Chapter Six.

Chapter Six, Analysis and Visualization of the Battlescape, reveals geographical trends apparent within the battlefield and uses geospatial analytical tools to depict the individual spatial elements of the combat zone. This chapter attempts to provide a full visualization of the historic data from Chapter Four, as well as, provides geographical boundaries to the statistical analyses produced in the proceeding Results. The full geographical analysis provides the necessary insight to answer the research questions and provides a conclusion on the warfare conducted off North Carolina. These conclusions are further discussed in the final section, Chapter Seven, Conclusion, along with limitations to the study, the potential implications of the study, and avenues for further research.

## **Conclusion**

In summation, the First World War has a lengthy and elusive history within the region that is slowly being rediscovered. This study lays out primary and secondary questions as the basic guideline to aid in data collection and to eventually render an interpretation of a battlefield, like previous Second World War scholars (as mentioned above). The next essential element to further explain the events that took place during 1918 is explaining the theoretical foundation to this study by exploring concepts within terrestrial and maritime archaeology that influenced this

study. In the following chapter, theoretical paradigms such as generalist and battlefield archaeology's histories are explored.

## **CHAPTER TWO: GENERALIST THEORY AND THINKING ABOUT THE BATTLEFIELD**

### **Introduction**

This thesis incorporates two frames of theoretical thought; Generalist archaeological approaches, and battlefield archaeology. Generalist theory introduced by Richard Gould (1983), Larry Murphy (1983), and Patty Jo Watson (1983) originally proposed the theoretical framework explored later in the chapter. As a study of a period of conflict and analysis of battlescapes, this thesis follows along with the dynamic theoretical school of thought following battlefield archaeology and complies with the current trends surrounding the sub-discipline. Finally, by using “battlefield patterns” a whole picture of human interaction can be derived. This chapter explores the history of both paradigms in archaeology and provides examples of similar work related to the subject of this thesis. By using historical, archaeological, and geographical data in a manner akin to John Wagner’s research, a complex but generalized map of all combatant interactions can be compiled.

### **Prelude to Generalist Approaches**

Maritime archaeology is relatively a young field, that has grown considerably since its earliest inception. In the beginning, excavations were completed under the guise of recovery of artifacts with little meaning of care for the significance or context of the work and often without archaeological standards (Muckleroy 1979:31). It was not until the 1960s that underwater archaeology moved towards becoming a systematic and scientific pursuit starting with the work carried out by George Bass in Cape Gelidonya, Turkey (Bass 1966). With the change of the field from salvaging to full scale excavations, there became a need to fortify underwater work as a

scholarly enterprise. By the late 1970s, explicit theoretical principles were applied to the field through the work of people like Keith Muckleroy (1979). Muckleroy not only sought to give maritime archaeology a purpose but to provide a working guide for the future of the field. He wrote:

The longest established and most highly developed of these disciplines, in the study of seafaring as in the study of most other activities, is the historical one, in which the primary concern is with the uncovering and interpretation of surviving documentary evidence for past events, and by which the researchers seeks to understand not only the precise course of events but also the reasons, causes, or motives behind them (Muckleroy 1979:24).

The main premise he strove to incorporate into the field was to view maritime culture as a scientific and humanistic venture, or human focused. Modeled after the anthropological approaches adopted by terrestrial part of the field, Muckleroy sought for archaeologists to look for the cultural elements within their research and fieldwork. He defined the discipline as,

Maritime archaeology is the scientific study, through the surviving material evidence, of all aspects of seafaring: ships, boars, and their equipment: cargoes, catches, or passengers carried on them, and the economic systems within which they were operating; their officers and crew, especially utensils and other possessions reflecting their specialized lifestyle (Muckleroy 1979:26).

For Muckelroy, artifacts are direct reflections of the culture that produced them. Ships and all they carry show the history of sailors, actors, and combatants, and belong to a larger and complex system of symbols and objects that existed in the past and may continue into the modern day. This paradigm forms the basis for the generalist approaches used today.

### **Generalist Archaeological Approaches**

The overall theoretical basis of this study is to incorporate a generalist approach and to analyze the overarching trends and interactions within a large but limited geographical space. Before the introduction of *Shipwreck Anthropology* in the early 1980s, studies in maritime archaeology had been mostly based on site specific approaches or *historical particularism*. Richard Gould (2000) comments on the use of particularistic theoretical approaches in his book, *Archaeology and the Social History of Ships*. He states;

Historical archaeologists in both land and underwater contexts have tended to prefer descriptive, particularistic approaches that focus upon the singular characteristic of the period and place they study. This historical-particularist perspective, though legitimate, is inadequate to the task of interpreting archaeological results (Gould 2000:2).

Although this perspective was originally popular and helped in establishing maritime archaeology as a legitimate field (Gould 1983:4), the theoretical view tends to focus on all the entirety of the shipwreck and treat it as a “time capsule.” The practice was predominantly popular with leader of the field, George Bass. The “time capsule” model was first disputed by

Muckleroy. This idea entailed treating vessels as an untouched exact sample of the historical period it came from. Larry Murphy (1983) disputed this concept,

This simile is somewhat limited conceptually, because time capsules are created by human intent, whereas shipwrecks are seldom deliberate. A time capsule usually results from the intentional, protected deposition of items thought to represent the present to the future (Murphy 1983:66).

Shipwrecks are rarely left undisturbed by either environmental or human processes and may reflect multiple cultures and time periods. During the 1980s, some underwater archaeologists disputed the value of *historical particularism*. The predominate issue facing the particularist standpoint is the lack of applications to the scientific orientation of modern fieldwork. Gone are the days where archaeologists could uncover cultural material without use of a research design or insightful anthropological questions. The field has become more science oriented and provided a wealth of information to other fields:

Classical archaeologists and historians have come increasingly to appreciate shipwreck studies as a valid scholarly approach. The stigma of underwater archaeology as somehow little more than sport diving or treasure hunting has been effectively dispelled (Gould 1983:8).

Without the need for particularism as a main verification of the field within academia, constructive critiques were made against the predominate paradigm. Observers concluded most

shipwreck archaeology up to that point had been particularistic and without a problem orientation (Murphy 1983:70). This lack of problem orientation is exemplified by George Bass' (1983) statement, "I find formal research designs restrictive rather than expansive, and choose to ignore them" (Bass 1983:100). This deficiency in formal research designs before conducting any field work troubled some archaeologists and prompted change.

With the mounting critique towards the predominant theoretical basis, Gould, Murphy, and Watson endorsed a shift towards a generalist approach. Generalist approaches in archaeology called for systematic surveying, problem-oriented and partial instead of total excavation of ship or raising of vessels, and explicit planning with a written research design (Gould 1983:21-22). As it explicitly states within its title, archaeologists conduct general surveys of the site or sites that they work on. Generalists use scientific reasoning to serve as a model for explaining past human behavior using observations and comparisons (Gould 1983:18). The primary focus of the theory is on using anthropology to recognizable patterns in material culture. Murphy best articulates this way of thinking, stating that, "considering the importance of ships to all maritime societies and viewing them as vectors for the spread of technology, ship construction and shipboard patterns of interaction also are important in contributing to the diffusion of general cultural traits as well as to maritime technology" (Murphy 1983:70). Generalists aligned underwater archaeology with terrestrial archaeology which had long since been partnered with anthropology as it developed as a social science (Watson 1983:33). The approaches strived to answer cultural questions about the past.

Of relevance to this thesis, John Wagner's analysis of the Second World War battlescape off North Carolina was completed using generalist ideas, articulated within its application to conflict archaeology;

This study is based on comparative and generalist theories. By making broad observations about the battle and the events occurring during it, the underlying social and behavioral factors of the battle can be analyzed, providing far more information about the engagement in North Carolina waters than a site-specific survey of one wartime casualty ever could (Wagner 2010:8).

While this present study illuminates ten specific cases of vessels sinking off the North Carolina coastline and interactions between submarines and ships at war, focusing on the site-specific details would not provide a complete picture of the complexity of a geospatial conflict nor put it within context of the overall events of the First World War. Instead this study attempts to study the war as an entire timeline (a process) in historical events leading to the recorded interactions to “inform and enlarge our general view of man’s [sic] relationship to his [sic] maritime environment, especially with respect to voyaging and matters of commerce, warfare, and other relevant factors” (Gould 1983:5). Through the inclusion of a generalist approach, one can understand a broader scope of events in social history.

Although historical particularism provides a wealth of information for a specific area of interest, it is an ill fit for this study. Wagner in his thesis elucidates that a particularist viewpoint could not produce a satisfying analysis of the Battle of the Atlantic during the Second World War:

This study, however, focuses on historic battle events and features ranging from attack locations to survivor rescues, to shipping routes, to minefield locations as artifacts, or pieces of *intangible* heritage, of human and social interaction. By

treating the intangible characteristics of the vessels involved in each event as attributes of that historical artifact, this study makes broad observations and generalizations about the battle (Wagner 2010:9).

Because of the variables encountered in studying warfare, it can be posited that one must seek the use of a generalist approach to capture the entire essence of the event as it unfolded. Like Wagner, the same characteristics and actors play into the attacks carried out during the First World War; operations like minelaying and minefields, sinking, survivor accounts and rescues, shipping lanes, and variations in human interactions can only be captured through broad observations and connections to events happening within similar geographic locations.

Another reason why a *historical particularist* approach is not applicable to this study is because of the lack of archaeological site work. Though surveys on the *Diamond Shoals Lightship* and the discovery of *Merak* has been conducted by NOAA (NOAA 2016), the remainder of vessels in the history of the First World War remain missing. This renders it impossible for site-specific archaeological studies to be conducted. Every event that occurred in its spatial region is far too complex to measure individually and reducing the conflict dismantles the ability to relay important social information about the agents involved. That is why it is pertinent for this study to be conducted under the guise of generalism, instead of historical particularism. As Wagner states,

There is nothing intrinsically wrong with the historical particularistic study of shipwrecks. It is just that examining shipwrecks as event specific and occurring

within a vacuum devoid of social, economic, and behavioral factors has its pitfalls (Wagner 2010:8).

A specific study on the casualties list or sinking of an individual ship cannot display the complex arena of the battlefield. By looking instead at the interactions as social events between combatants and non-combatants, a larger, more impactful view of the battlefield can be achieved. Although a generalist view is not singular in the theoretical framework adopted for this study. With generalist theory in mind, another paradigm in archaeology that is applicable is battlefield archaeology.

### **Battlefield Archaeological Theory**

Although battlefield archaeology has been practiced since the 1980s as a sub-discipline of historical archaeology, it has seen significant development over the last six or seven years – much of which has influenced maritime archaeological approaches to naval engages. Battlefield archaeology as a methodology and theoretical paradigm has been traditionally applied to terrestrial fields of conflict. It was first utilized by Douglas Scott and Richard Fox (1987), on the Little Bighorn battlefield site. This battle took place between the Seventh United States Cavalry lead by Colonel George Custard and Sioux and Northern Cheyenne, the conflict stemming from the forced relocation of tribal peoples onto reservations. On June 25, 1876, the Seventh Cavalry met the Sioux and Northern Cheyenne on the banks of the Little Bighorn River where fighting continued over the course of two days (Scott et al. 1989:13). In the end, the battle concluded with heavy casualties for the United States forces,

268 of the nearly 600 men command died (262 died on the field and six later died of wounds. The Indians, some 10,000 people of which perhaps 2,000 to 3,000 were warriors, escaped to the south, suffering an estimated loss of only 150 warriors (Scott et al. 1989:13).

The area was later designated as the Custard Battlefield National Cemetery. Scott and Fox were given the opportunity in the early 1980s to conduct a survey of the entirety of the battlefield. Before them there had been no systematic or controlled investigations of the archaeological remains from which to draw detailed conclusions on the Little Bighorn site (Scott et al. 1989:25). Scott and Fox focused on artifact collection, the geology of the region, osteology of the human remains, and faunal remains to draw meaningful conclusions about how the battle had been conducted. Both archaeologists focused on looking for patterns within the archaeological data collected.

By looking at artifact placement and the position of human remains, exchanges between the Seventh Cavalry and Sioux and Northern Cheyenne could be inferred. The interactions were measured and mapped into the concept of a “battlefield pattern”, which;

... is based on the recognition of individual behaviors as they are represented in the artifactual record. The integration of individual behavior patterns results in the identification of unit patterns (Scott and Fox 1987:126).

Scott and Fox’s work paved the way for future studies of terrestrial battlefields and areas of conflict. As he later stated,

Although there has been a long history of interest in the material remains of conflict, it is only recently that the necessary tools, methodology, and theoretical approaches have been combined to allow serious scientific contributions to the holistic study of past human conflict” (Scott and McFeaters 2010:103).

With a great change in technology and insight, archaeologists have applied the theoretical basis established by the 1980s study of Little Bighorn to sites across the world.

Later, the sub-discipline included conflict archaeology to incorporate all sites associated with war time activity (Freeman and Pollard 2001:1). Since then, battlefield sites dating to all periods in American history have been archaeologically investigated. Areas that have been examined through the application of conflict archaeology methods include: The Revolutionary War, War of 1812, Red Sticks War, Mexican War, Civil War, and Indian Wars (Cornelison and Cooper 2002:29; Haecker and Mauck 1997). Though early site work focused more on fortification studies, the spatial regions varied from terrestrial sites to underwater regions underwater sites (Conlin and Russell 2006), which will be further examined later within the chapter.

Outside the United States, battlefield studies became popular with classical studies on Greco-Roman sites (Scott et al. 2009), and even with Prehistoric conflicts (Keely 1996; LeBlanc 1999, 2001). Battlefield archaeology has advanced with the change in technology, going from the use of a basic metal detecting surveys to complex applications produced in ArcGIS (Scott and McFeaters 2010:111). With this range in technology and scope of battles, battlefield

archaeology expanded over time to incorporate different geographical regions and historical time frames.

Most recently terrestrial archaeologists have surveyed major battlefields and the remains of World War Two in Europe. David G. Passmore and Stephan Harrison's *Landscapes of the Battle of the Bulge: WW2 Field Fortifications in the Ardennes Forests of Belgium* (2013) and Tunwell et al.'s "Landscape Archaeology of World War Two German Logistics Depots in the Forêt domaniale des Andaines, Normandy, France" (2015) are two examples of the focus on Second World War archaeology. Despite the heavy emphasis of land-based surveys, there is a great potential for its application within maritime work.

Traditionally "battlefield" has applied to a narrow idea of space of conflict, relating to only terrestrial areas of conflict and ignoring Naval history and archaeology. With the definition of a battlefield being "[a] 'historic battlefield' is a defined space in which organized groups of armed people did regulated violence upon on another" (Schofield et al. 2002:9), there is no exclusion towards the space being part of a waterway or an ocean. Although it may appear strange to some that an area of ocean can be deemed a battlefield (Wagner 2010:10). Battlefield archaeological approaches can and have been adapted to allow for geospatial maritime analyses. Though some of the earliest full-scale shipwreck excavations included famous warships, and representations of historical nations at war, *Vasa* (excavated in 1961) and *Mary Rose* (excavated in 1982), underwater archaeologists did not observe the ships within the larger context of the conflicts they had been bound to engage in.

Some studies include Russell and Conlin's (2010) study of the engagement of the CSS *Hunley* and USS *Housatonic* and looked at the vessels spatial orientation to determine the mysterious sinking of *Hunley* after the submarines one and only success, and John Broadwater's

(2011) inclusion of maritime and terrestrial analysis of the battle of Yorktown. Recent areas of focus on battlefield archeology have been on more modern conflicts. Numerous work conducted by British archaeologists under the direction of Innes McCartney, focused on major naval skirmishes such as the famous World War One battle, Jutland. He recently published a compiled book titled, *Jutland 1916: The Archaeology of a Naval Battlefield* (2016) along with other pieces attributed to the First World War.

Traditionally students and professors alike within the Maritime Studies Program at East Carolina University have carried out studies relating to battlefield archaeology and focused primarily on the Second World War. Earlier work on the Battle of the Atlantic include, Chris Cartellone's (2003) thesis, "Trawlers to the Rescue: The Role of Minor War Vessels" In *Securing the Eastern Sea Frontier, 1942,* Samuel Blake's (2006) thesis, "A Comparative Study of the Effectiveness of German Submarine Warfare on the Eastern Seaboard of the United States in the World Wars." Though Wagner's work is now several years old, it is still a notable study and since then there have been theses based upon and expanding his original research. Scholarly productions on the Battle of the Atlantic include: John Bright's (2012) work on the attack on Convoy KS-520, which successfully analyzed a large conflict off North Carolina's coastline using the lens of battlefield archaeology. These works were accompanied by a series of related theses (Sanchagrin 2014; Fox 2015; Sassorossi 2015; Freitas 2017) all adding to a decade long scholarly tradition of studying a complex and destructive war.

Battlefield archaeology and areas of study relating to conflict have an extensive history ranging from Ancient to modern wars. Ever since human kind engaged in and inflicted violence upon one another on land, they found ways to take their confrontations to the seas. Because many of the earliest excavations of shipwrecks were vessels relating to wartime activities,

maritime archaeology as a discipline is forever tied to this theoretical practice. With the history of the theory exemplified and terrestrial and maritime sites explored, it is important to transition from broad aspects towards a narrower scope applicable to this thesis.

### **Relating Theory to Practice**

Following with Wagner's analysis of the Battle of the Atlantic and generalist theory, "which entails treating each site as an individual artifact and requires no excavation or evaluations of the site, the term- 'battlefield archaeology' and the theories presented within the discipline may best define large-scale maritime battle seascapes" (Wagner 2010:10), deems the theoretical practice suitable for naval use. Because of the large data set of wartime activities in the archaeological record, maritime archaeology has incredible potential for the application of battlefield theoretical practices. David L. Conlin and Matthew A. Russell (2011) accentuate this idea in their chapter "Maritime Archaeology of Naval Battlefields,"

Battlefield archaeology is fundamentally about looking beyond individual sites and small-scale activity areas to larger contexts. These larger contexts encompass a series of events and human behaviors that may have a very short time span but that typically involve larger areas than most archaeologists consider when looking at sites (Conlin and Russell 2011:39).

The focus of this study is to capture the core of battlefield archaeology and apply it to the North Carolina coastline. An added transgression in the study of World War history is the tendency of the public to only assume the importance of terrestrial battles, and aspects on land or in the air

including but not limited to; airplane dogfights, trench warfare, and chemical warfare. Many forget that the First World War showcased Naval battles and technology beyond the battle of Jutland. For the United States, the First World War lasted two years (1917-1919) along the Eastern Atlantic and involved quick and sudden interactions between enemy vessels. Despite being short skirmishes, the impacts were significant enough to leave left an archaeological imprint suitable for examination with approaches borrowed from battlefield archaeology.

Battlefield archaeology is also useful to understand human patterns of behavior through the material remains left behind. As stated by Lyn Dore in her paper “Once the war is over” (2001) in *Fields of Conflict: Progress and Prospect in Battlefield Archaeology*,

Battlefield archaeology as a research interest must therefore be cognizant of the different forms of warfare, of the temporal dimension involved, and of the transformations of the landscape that occurs over time. Whilst some studies focus on the military tactics employed, the armament used, the offensive and defensive fortification and structures, very few studies have yet to consider the issue of the socially modified landscape. Issues of landscape hold the key to the understanding the meaning and sentiment attached to battlefields (Dore 2001:283).

Hence, according to battlefield archaeology, the key to understanding the past is through looking at the modifications made by combatants to their environment and the materials left behind, then to record the distribution of artifacts and structures. From a scholar’s standpoint, this entails viewing the remnants of quick interactions and heated moments to explain the human reasoning

behind the chaos. U-boats are known for being quick to attack and bring destruction, leaving behind small and large signatures that modify the seascape around them. Whether that is through sinking a vessel, collecting or leaving goods, abandoning or rescuing parties of sailors, or even missing or warning firing at ships to stop. Overall, this study analyzes the remains of Allied and Central Powers activities which have become a part of the archaeological record.

Like Wagner, this thesis applies battlefield archaeology in a non-traditional sense, in that the study draws from non-physical remains to craft a map of the area of activity,

Since a survey to ground-truth each event location presented here is far beyond the scope of this thesis, and many of the historic events related, such as attack locations and survivor rescue locations, have not left any physical traces, each historic coordinate is treated as an intangible archaeological and geographical “artifact” that can be mapped using GIS software to show areas of battle activity. This is possible since the events that have not left physical remnants in the study area have often left behind tangible traces in the form of historical accounts and geographical coordinates that can be mapped into the battlefield GIS (Wagner 2010:14).

Many of the coordinates given in the case of interactions during the First World War have yet to be discovered as physical archaeological sites, thus the need to treat historic records of sinking locations as a tangible artifact. The primary battles off North Carolina involve a strategic and timely attacks on unarmed merchant vessels, with crews of different nationalities and nations. Though many engagements include combatants harming non-combatants, there is still a social exchange taking place within an established geographical region undergoing a conflict, marking

the region as a battlefield. By studying the artifacts within the archaeological record, a pattern of human behavior can be measured, as well as, quantified into a composite map of activity.

Applications through GIS efficiently and effectively measures the degree of interactions over all.

### **Conclusion**

Furthermore, through theoretical applications of anthropological and archaeological schools of thought a more thorough picture of human interactions during the First World War. By looking at the points of contact between combatants and non-combatants as artifacts within their own context and comparing them overall, a generalized view of the datasets is later incorporated to render significant maps and images of a larger battlefield. Using battlefield archaeology as a subfield and its application to maritime archaeology, a complete look at patterns can be interpreted and concluded as humanistic traits and trends during the conflict. By using several datasets to complete a digital rendering in GIS, patterns of behavior can be inferred from movement between enemy submarines and merchant vessels.

## **CHAPTER THREE: METHODOLOGY**

### **Introduction**

To fully understand what occurred during the First World War off North Carolina, primary and secondary sources were accessed in archives. The topic itself contains a wide data pool from different sources on the attacks, losses, and geographical locations. With such a multifaceted subject, it is easy to become bogged down with too many details. To complete a full retelling of events, the collection of data and production of new information needed to be broken down, like Wagner's methodology. The work compiled in this thesis occurred in three phases: historical research, geospatial modeling, and analysis. The historic research phase consisted of visiting archives and cultivating secondary data sources. The second phase included the collection of several maps and charts before importing them into ArcGIS to produce shape files and geodatabases. The final phase comprised the statistical and spatial analysis to fully understand and visualize the different features of the battlefield.

### **Historical Research**

Before visiting any archives or conducting further research on the extent of the activity off North Carolina, a list of merchant vessels sunk or attacked had to be completed to efficiently navigate sources for pertinent data. An initial search was conducted using uboat.net, an online resource list of recorded losses and attacks conducted during the First and Second World War, and through older available texts from Josephus Daniels (1920) and William Bell Clark (1929). Sources were also compared to known diving records from David Stick (1952), Bruce D. Berman (1972) and Joan D. Charles (2004). Once individual vessels were determined and the

primary U-boats responsible for the attacks, a table was completed to organize the data collected (below).

Table 3.1. Known shipwrecks resulting from U-boat interactions off the coast of North Carolina (Sources: Daniel 1920; Clark 1929; Gentile 1992, 1993; Charles 1999; Heit 2012; Uboat.net 2016a, 2016b, 2016c, 2016d).

Vessel name	Date of sinking	Probable cause	Nationality/Type of vessel/etc.	Position given at time of sinking
<i>Harpathian</i> (1913)	June 5, 1918	Torpedoed by U-151 Attacked	British Steamer	36° 30'N., 75° 00'W.
<i>Vinland</i> (1906)	June 5, 1918	Bombed on the surface by U-151 Attacked	Norwegian Steamer	36° 32'N., 73° 58'W.
<i>Pinar del Rio</i> (1895)	June 9, 1918	Gunned on the surface by U-151 Attacked	American Steamer	36° 16'N., 73° 50'W.
<i>Vindeggen</i> (1916)	June 10, 1918	Bombed on the surface by U-151 Attacked	Norwegian Steamer	36° 25'N., 71° 29'W.
<i>Henrik Lund</i> (1906)	June 10, 1918	Bombed on the surface by U-151 Attacked	Norwegian Steamer	36° 30'N., 71° 29'W.
<i>Stanley M. Seaman</i> (1908)	August 5, 1918	Bombed on the surface by U-140 Destroyed	American Schooner	34° 59'N., 73° 18'W.
<i>Merak</i> (1910)	August 6, 1918	Bombed on the surface by U-140 Destroyed	American Steamer (formerly Dutch)	34° 57'N., 75° 40'W.
<i>Diamond Shoals Lightship</i> (1897)	August 6, 1918	Gunned on the surface by U-140 Destroyed	Lightship #71/C.G. Vessel (American)	35° 05'N., 75° 10'W.
<i>Mirlo</i> (1917)	August 16, 1918	Mines from U-117 Attacked	British Tanker	35° 30'N., 75° 18'W.
<i>Nordhav</i> (1893)	August 17, 1918	Bombed on the surface by U-117 Attacked	Norwegian Bark	35° 42'N., 74° 05'W.

Though historically, the attack on *O.B Jennings* by U-140 is interpreted as a North Carolina shipwreck, the corresponding sinking position puts the ship in Virginia's water ways. Gary Gentile also classifies *O.B Jennings* as a Virginia shipwreck within his various literature on historic ships for recreational divers (Gentile 1993:63). For this study the only vessels included within the losses are the ten previously mentioned in Table 3.1: *Harpathian*, *Vinland*, *Vindeggen*,

*Pinar del Rio, Henrick Lund, Stanley M. Seaman, Diamond Shoals Lightship, Merak, Mirlo, and Nordhav.*

Nonetheless, there were several ships lost during the war, there were also a handful of vessels that interacted with the U-boats in a variety of ways, as shown below (Table 3.2).

Table 3.2. Known ships attacked or attacking U-boats off North Carolina (Sources: Daniels 1920; Clark 1929).

<b>Vessel Name</b>	<b>Date of Interaction</b>	<b>Interaction</b>	<b>Nationality/Type of Vessel, ect.</b>	<b>Position Given</b>
<i>Nicholson</i> (unknown)	June 5, 1918	Stopped by U-151 but allowed to leave	American (Whaler)	36° 30'N, 73° 40'W
<i>Benleuch</i> (unknown)	August 6, 1918	Fired upon and chased by U-140	British (Steamer)	35° 05'N, 75° 10'W
<i>Uberaba</i> (unknown)	August 10, 1918	Fired upon by U-140	Brazilian (Steamer)	35° 51'N, 73° 21'W
<i>U.S.S. Stringham</i> (1916)	August 10, 1918	Depth charged U-140	American (Destroyer)	35° 51'N, 73° 21'W
<i>U.S.S. Pastores</i> (1913)	August 13, 1918	Fired upon by U-140 and returned fire	American (Commissioned Merchant Steamship)	35° 30'N, 69° 43'W

Although these vessels were not sunk by the submarines, they become part of the historic narrative of the conflict off North Carolina's coast. Battles are not entirely measured by the number of losses and casualties, but also by the damages caused and impact made on the landscape. The aim of this thesis is to recount the entire story of interactions off North Carolina, including the dynamic nature of actors in the war. For a concise timeline, reports of sightings of submarines was not recorded as an interaction. There were statements given by a plethora of ships during the war observing the U-boats in question, however, due to the conflicting nature and sensationalist air that gripped the American public during the period, the author deemed them unimportant for this study. Daniels often reported on the inaccuracy of many sightings given to the United States government in conjecture with the known records kept by the

submarine captains (Daniels 1920:45). Finally, the fifteen ships mentioned above were determined as the primary Allied and Neutral actors within the war, without further complicating the narrative and ultimate projection of the battlescape. The three Central Powers combatants in this story include the vessels: U-151, U-140, and U-117, as they were the only submarines to leave archaeological signatures across the North Carolina coastline.

### **Primary Sources Archives**

Upon completion of the table and establishment of the main actors within the battles, archival research was the next step. Due to the indefinite closure of the Mariners' Museum in Newport, Virginia, the site was not accessed for research. Traditionally other theses have been able to access this resource for data, however, other available archives served in its place. The first location visited was the State Archives of North Carolina, situated in Raleigh, North Carolina. The primary sources from the collection included the actions conducted by the state during the First World War. The World War One military collections on the North Carolina Council of Defense Records, including Home Guard, Shipbuilding, Research Information Committee, and Miscellaneous items. (Military Collection. XI. World War I Papers, 1903-1933, Box 1 National US Government, Box 10 Home Guard and Council of Defense, Box 14 Shipbuilding, Box 25 Miscellaneous).

Collections from the Outer Banks Historical Center, in Manteo, North Carolina added to the home front data pull. Sources include photographs of U-117 and the crew of *Mirlo* after being rescued (National Park Service, Box 33, 33GRF-78-3-41, Standalone Photographs, Box 33, 33GRF-0-544). The *Mirlo* wrecking component of the 33 MSS 112 Chicamacomico Historical Society Records, including transcripts from the official statement given by John A.

Midgett on the sinking of *Mirlo* in 1920. These collections added to the historic narrative of the wrecking process of the ship and provided first person narratives of primary events of interest.

The next stop in the research process was at the University of North Carolina in Chapel Hill, North Carolina. The archives featured a series of personal documents and books written by key political figures during the First World War such as, books by Josephus Daniels, including, *The United States Navy in the World War, Our Navy at War* (1924a), and, *The Wilson Era 1917-1923* (1924b). Daniels was secretary of the Navy during this time and served as a key witness to events as they unfolded. His books serve as primary sources of wartime responses to the U-boat attacks off the east coast and critique the overall war effort on both the American and German sides.

The final push for research included travel to the District of Columbia, starting with the Library of Congress. Within the Jefferson Reading Room, several books were accessed including *Merchant Shipping Losses*, a report by Great Britain's Admiralty (1918), and Lowell Thomas' *Raiders of the Deep* (1928), a collective book on oral history conducted after the war from infamous U-boat captains and officers, including one of the crew members from U-151. Most sources from the Library of Congress were secondary accounts of submarine activities, however, the National Archives of Washington D.C. was nearby and easily accessible. Despite this, the main archives in Washington D.C. proved to not be useful in the collection of information. A singular collection aided in the furthering of this thesis, including documented 5" by 7" cards on "Merchant Shipping Losses in the First World War," however, the staff indicated time would be better allocated at the nearby archives.

National Archives- College Park, of College Park, Maryland proved to contain the most useful records in the completion of this thesis. The Archives contained printed copies and

microfilm of U-boat Captain's Diaries from U-151, U-140, and U-117, in Record Group 242: National Archives Collection of Foreign Documents Seized 1675-1958. During the First World War, U-boat captains were required to keep journals of their activities for the Germany Navy including details of events, tacking, windage, locational information, ships encountered and/or, mines placed (Figure 3.1), and torpedoes used. Captains were also tasked with completing maps of their travels and minefields.

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**Torpedoverbrauchsnachweisung S. M. „U 117“**

für die Unternehmung vom 11. Juli bis 24. September 1918.

Kommandant: Kapitän Bräuner

Bf. Nr.	Datum	Torpedozahl	Torpedo Nr.	Unter Wasser		Über Wasser		Ziel	Bemerkungen über Verlager, Schiffsart, Ereignis etc.
				Zufuhr	Bestand	Zufuhr	Bestand		
1	31.7.18	G 6 A 7 *	11470	-	-	-	ja	Anscheinend 3 Schornsteinrohrzerstörer.	Verantwortlich untersee
2	4.8.18	"	12731	-	ja	-	-	Donner eines Geleitzuges. Rohrzerstörer. Anmerk. Druck war zu gering.	
3	13.8.18	"	12734	ja	-	-	-	Amerik. Donner 3000 t	
4	"	"	13705	ja	-	-	-	Franken Donner 7000 t	
5	14.8.18	"	13379	-	ja	-	-	Schooner mit 5 Masten. Unterschossen.	
6	16.8.18	"	13387	ja	-	-	-	Amerik. Donner 2500 t	
7	21.8.18	"	12799	-	ja	-	-	Ital. Donner	Torpedo hat gekurbt
8	27.8.18	"	12644	ja	-	-	-	Amerik. Donner 2500 t	
9	5.9.18	"	11431	-	ja	-	-	Engl. Donner (Flakstellung)	Rit Bestimmung u

DECLASSIFIED  
Authority NND52598

FIGURE 3.1. U-117 torpedo dispersal list (Photo from the National Archives, College Park).

Though many documents on submarines were destroyed after the war ended, the diaries were captured by American forces and kept as classified documents until 1948. Despite the collection being largely untranslated from their original language, the documents came typed and contained obvious information that could be easily converted later into the mapping process.

## **Published Primary Sources**

Traditionally the *Lloyd's Register of British and Foreign Shipping* has been used to access important shipping information, however, there is a gap in availability of information for the pre-World War years. Instead access to the book, *Lloyd's War Losses: The First World War, Casualties to Shipping Through Enemy Causes 1914-1918* (1990), helped obtain shipping information on the vessels in question. As for non-merchant ship related sources, photographs with information on the U-Boat Captains were obtained through the digitized copy of Yves Dufeil's (2012) book, *Kaiferliche Marine U-Boote 1914-1918: Dictionnaire Biographique Des Commandants De La Marine Imperiale Allemande*. The book is untranslated from its original language but has primary information collected on the unknown history of early submariners.

## **Secondary Sources**

Published second hand accounts were invaluable in guiding the researcher towards primary source material and formulating the structure of this thesis. The secondary sources used within the production of this thesis fall under three categories: aids in historic events, aids in technical history, and aids in local conditions. The first group contains information relayed from the cultural history of the First World War. Books like, *America's U-Boats: Terror Trophies of World War I*, by Chris Dubbs (2014), helped with completing the history of attacks off North Carolina and the eventual destruction of the submarines during the post war period. Dubbs recounts the United States receiving U-117 and U-140 as war reparations and their journey beyond the conflict. Another source, *German Subs in Yankee Waters*, by reporter Henry J. James (1940), repeated and added to the social history of the events. His book further confirmed the

reports given of the activities of the captains and crew onboard allied, neutral, and central powered vessels.

Other important sources used include; books on general warfare (Tarrant 1989; Tennent 1990) and technical sources on the history and design of U-boats. Most notably, *German Warships, 1815-1945* by Erich Groener (1990) and, *The U-Boat: The Evolution and Technical History of German Submarines*, by Eberhard Rössler (2002) both added to the design history and evolution of U-boat production before and during the war. Though only contributing to the history of the thesis, they illuminated important moments within German history that add to the overall narrative of the past.

The final sources utilized were local guides, diving books, and shipwreck anthologies. As previously mentioned authors like Gary Gentile were used in the production of Table 3.1. Gentile produced several books used to overlay information on the ships of interest and even wrote a book on U-boats during the First World War. Books accessed include: *Shipwrecks of North Carolina from Hatteras Inlet south* (1992), *Shipwrecks of North Carolina from the Diamond Shoals North* (1993), and *The Kaiser's U-boats in American Waters* (2010). Other prominent local guides used were: David Stick's, *Graveyard of the Atlantic: Shipwrecks of the North Carolina Coast* (1989, originally published in 1952), Bruce D. Berman's, *Encyclopedia of American Shipwrecks* (1972), and Joan D. Charles' (2004) *North Carolina shipwreck accounts, 1709 to 1950: including over 1100 entries named wrecks*. These sources helped confirm the locational information of the shipwrecks, as well as, define the historic battlescape and disputed actors within the conflict. Once the research had been completed, the next step within the production of this thesis became the collection of charts and maps to begin compiling an accurate GIS map.

## **Geospatial Modeling**

To effectively produce a detailed and accurate map through ArcGIS, cartographic information needed to be collected before conducting any digital work. Several maps produced during and after the war contain invaluable data on the geographic features analyzed within this study. Once the maps were collected and data important, the creation of a functional GIS map began with the use of converting information into shapefiles as means to visualize the historic coordinates.

## **Charts and Maps**

At the end of the First World War, Americans and Germans completed maps and charts based off recorded movement and sinking activities carried out during the conflict. The first maps accessed came with the book, *German Submarine Activities on the Atlantic Coast of the United States and Canada* and included “Chart No. 1 German Submarine Activities in the Western Atlantic Ocean, 1918” (1920) and “Chart No. 2 Summary of Enemy Mining Activities on United States Atlantic Coast” (1920). Both maps originated from surveys and data collection efforts from British Intelligence during the war, were produced by the United States Navy, and came with labeled geographic locations and courses of the U-boats and mine fields.

The other maps come from the previous U-boat Captain collection from the National Archives-College Park (Record Group 242: National Archives Collection of Foreign Records Seized, 1675-1971, Boxes 1-3). As part of being a high-ranking officer within the German Navy, captains completed detailed journal entries, logs, and mapping exercises as reports of their activity. Some officers like Waldmar Kophemal used recorded Latitude and Longitude positions to plot points of distance traveled (Figure 3.2), while Otto Dröscher carefully indicated the points of interest and boundaries of the minefields crafted by U-117 (Figure 3.3).



FIGURE 3.2. Half of the map produced by Kophemal of U-140's crossing of the Atlantic (Photo from the National Archives, College Park).

The attention to detail and the inclusion of recorded longitude and latitude added to the United States' charts that contained few informative details on the physical locations of the mines, completing the picture of the battlescape and adding to the production of a highly accurate map. After the collection and comparison of maps were completed, and historic data points verified, the creation of GIS-based maps became the next priority.

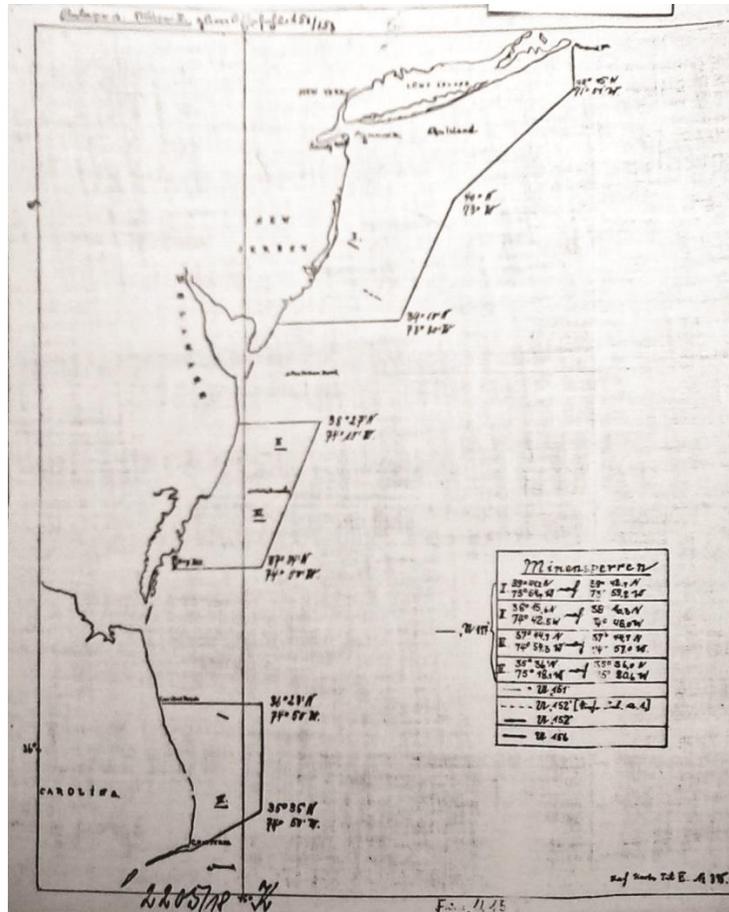


FIGURE 3.3. Dröscher’s map of the minesfields produced by U-117 (Photo from the National Archives, College Park).

## Geographical Information System

*ArcMap* is an important tool in the rendering of geographic data into a visually pleasing format.

The use of ESRI’s ArcGIS was chosen based off the capabilities exhibited by Wagner and other’s theses, as it is a relatively complex but integrative system, that allows the user to render highly accurate maps. The first step towards completing the map after using a standardized basemap is to organize the historic coordinates within a sequence of events. These coordinates are easily transferable from their original degrees, minutes, seconds format into decimal degrees. Though there is a margin of error within the conversion of these points recorded during 1918 into

locations in the modern day, they are transferable into a Microsoft *Excel* spreadsheet, with labels of the names of the vessel and the points associated with its last known location and are saved as csv file. These files create xy coordinates and when added to the map and displayed as events or shape files upon converting the data to the same datum as the map. For accuracy in the production of the maps, North American 1927 (NAD27) datum was used despite not having existed during the generation of the original maps and charts utilized in this thesis. The likely datum used by the U.S. Navy and the Germany submariners does not currently exist within ESRI's mapping system, however the author determined the closest fit for the overall interpretation of the data was NAD 1927 due to geographic location and time frame.

The next step proceeded beyond the geographic boundary to create a map with the complete picture of movement of the U-boats across the Atlantic Ocean. Using known points of contact, *Excel* spreadsheets were made and added as xy data to the map before being converted into points. Geodatabases for each submarine were established to generate line files. To keep data organized, each submarine has its own labeled folder for files to go into. As for eliminating any confusion on the overall map, each U-boat is color coded to simplify the display; U-151 is blue, U-140 is red, and U-117 is green.

The next step was to change the xy data to a shapefile after viewing the placement of the data points on the map. From these shapefiles, lines are extracted using the toolbox feature of *ArcMap*. Accessed under data management tools and features, the tool points to line is available for converting the point data into an actual line file. Once the line file had been created, the marker changed to signifying color and to show movement. The same process used to create the shipwreck and movement files was used to craft the minefields based on both Drösher's own map and the points crafter by the United States. Overall, the map followed along with the historic

records accounts of events as they occurred and showed unique patterns of movement that could only be understood through the final use of analysis of the displayed shapefiles.

### **Analysis**

The analytic portion of this thesis revolves around two aspects: statistical and spatial analysis of the collective data and GIS production. The first phase is compiling the data into an organized form to better show the trends and variables, before having it converted into an aesthetically pleasing medium of work, such as; charts or graphs. The following phase is the production of several maps within *ArcMap*, while using the important data to yield a significantly detailed map of the geographical trends.

### **Statistical Analysis**

Before conducting geospatial analysis, the data needs processing. This primary step is the visualization of data before conducting any mapping. Collected in a Microsoft *Excel* spreadsheet, the historic data accumulated on the total amount of tonnage, damages, wreckage, nationalities of vessels, and losses accumulated over time will be input to create diagrams of the quantified information. By exporting the data into an *Excel* sheet, the information is displayed in synchronic and diachronic charts, highlighting both non-temporal projections of data and time-sensitive analysis of events.

Upon the compiling of data within the spreadsheet, charts and graphs become the next step in visualizing and exporting the information. Using features within *Excel*, the most important features within the data (such as nationalities, tonnage lost, damages) are projected into synchronic events happening only within 1918, and diachronic formats, factors spanning

from before and after the war. These graphs convey the overall arching trends within the data and provides a greater understanding with how the battle itself was conducted over time. This also serves as the basis for the visualization of battlescape and allows for a greater meaning of the actual cost of the war itself.

### **Spatial Analysis**

The last step in completing this thesis was the use of spatial analysis to determine the battlescape off North Carolina. Following along with Wagner's principles, the first step is to generate several different maps within *ArcMap* itself, while using different geospatial analysis tools and shape files. Despite reusing some of the same data in the initial set up, "the different maps portray diverse ways of observing the battlefield in relation to historic trends in activity, shipping routes, and U-boat attacks" (Wagner 2010:39). After examining the most important features of the battle including directionality, centrality of events, natural and artificial borders, nationalities represented, and scale of combatant and non-combatant involvement, a battlefield may be rendered. These geographic trends articulate the entirety of the combat zone and guide the researcher in the creation of the map, using polygon lines to detail the areas of prominent interest. *ArcMap* contains a variety of complex georeferencing tools that provide a wealth of information on datasets, including: mean center, kernel density, and convex hulls, all of which were employed by the author and shown in Chapter 6.

Mean of center identifies the geographic or concentration center from a set of features. The polygon features compiled above of all points in the battlefield only need to be selected by the tool to generate a central position on the map. This singular polygon represents the midpoint

of all locations and provides an interesting geographic locality otherwise not recorded or previously lost to history.

Kernel density distributes the quantity points in a specified or neighboring area and creates a raster model representing the frequency of events overall. This tool is the same as mean center and requires the use of a collection of features already created in *ArcMap*. Once selected, the tool will determine the distance and number of points within the dataset but requires the selection of a field to base the calculation off. For this study the author used a table including the recorded number of events for each ship or war-time activity (mine-laying). Once the proper measurement is selected, the tool produces a raster layer of data depicting the general area and important features, using a color gradient depicting the frequency of events and interesting battlefield activities.

The final tool used to examine the extent of events off North Carolina were the use of convex hulls. Part of the minimum bounding geometry toolset, convex hulls create a polygon over a set of features to display their geographic extent on a map. Unlike the other options within the set of polygons, this tool allows for more flexibility in displaying the boundaries of activity and covers the extent of all points, instead of generating a generic box on top of a group of points. When selecting this tool, it is important to choose the convex hull option, otherwise it will default to rectangle by area. Each individual U-boat was treated to this process, color coded, and then compared among one another. These toolsets allow for the overall geographical trend to be understood and provide the information required to craft the final map of the battlescape.

## **Conclusion**

By taking a broad approach and following a similar methodology originally crafted by Wagner, the First World War battlescape is entirely achievable using a full historical, geographical, and statistical analysis of the area. By organizing the data and converting it into multiple visualizing platforms, overarching trends became observable. Statistical information added meaning to the historic data and serves as a basis for other potential research undertaken in other areas outside North Carolina waters, and may serve as a comparison between World Wars. By using a general methodology and working in phases, the structure allowed for the completion of research with minimal risk of diverging from the main goal which is the highly accurate creation of a series of maps on the battlescape off North Carolina.

## CHAPTER FOUR: THE U-BOAT MENACE

### Introduction

In April of 1917, America entered the Great War with fresh enthusiasm. Finally provoked by the German regime's use of excessive force with the unrestricted U-boat campaign and the uncovered infamous Zimmerman telegram, a coded message between Mexico and German foreign secretary Arthur Zimmerman promising the reacquisition of Texas, New Mexico, and Arizona if the country attacked the United States, President Woodrow Wilson gave orders for the mass movement of troops and supplies delivered into Europe (Hillstrom and Hillstrom 2013:78). Before the war began, Congress prepared for the inevitable attack of their shipping and coastline by establishing several defensive boundaries of strategic areas. To protect the vast expanse of the Atlantic coastline, the United States established eighteen strategically placed defensive zones. In his book, *When the U-Boats Came to America* (1929), William Bell Clark recorded two important areas within Virginia and North Carolina, "the mouth of the Potomac River [and] Wilmington, North Carolina" (Clark 1929:13). To further ensure the country's protection, the United States Navy established six naval districts to execute tasks involving patrol and defenses along the coastline. The sixth district included, "The Carolinas and Georgia and that part of Florida north of the mouth of the St. John's River" (Clark 1929:16). Charleston, South Carolina became the head of the sixth district and all activities in North Carolina was passed along to the head Admiral.

Alongside the implementation of defensive zones, the Government set up the Emergency Fleet Corporation and the Anti-Submarine Council (Figure 4.1). Headed by the Secretary of the Navy, Josephus Daniels and containing famous figures such as: American inventor Thomas Edison, their main task included developing new and impressive technologies to locate and

destroy enemy submarines. Despite the Governmental orders and protections, the individual states themselves also needed involvement in the war effort and their own defense.



FIGURE 4.1. Image of the Naval and Anti-Submarine council, prominent members including Thomas Edison (bottom second on the left) and Josephus Daniels (to Edison's right), 1918 (Photo courtesy of Josephus Daniels).

Josephus Daniels himself was a North Carolinian, having been born in Washington, North Carolina in 1862 (Cambell 1999:39). Daniels studied at the University of North Carolina Chapel Hill and pursued a career in journalism and politics. He worked as a prominent editor for several newspapers across the state. As described by W. Joseph Cambell (1999) in his article, "One of the fine figures of American journalism": A Closer Look at Josephus Daniels of the Raleigh News and Observer",

Daniels became editor of a local newspaper, the *Wilson Advance*, in 1880 and later edited the *State Chronicle*, a daily newspaper in Raleigh. He sold the money-losing newspaper in 1892 and started the *North Carolinian*, a weekly that was financially supported by the Democratic party (Cambell 1999:39).

Daniels would later become the editor of Raleigh's *News and Observer*, a popular Democratic newspaper. As a democratic reformer he supported Woodrow Wilson's presidency and was given the position as secretary of the navy.

### North Carolina Prepares

The North Carolina Defense Council was erected in coordination and cooperation with Josephus Daniels and the Governor Thomas Walter Bickett. The Defense Council comprised itself of several politicians within different cities and counties from prominent areas including; Charlotte, Wilmington, Fayetteville, Raleigh, Durham, and the entirety of Wake County (Figure 4.2).

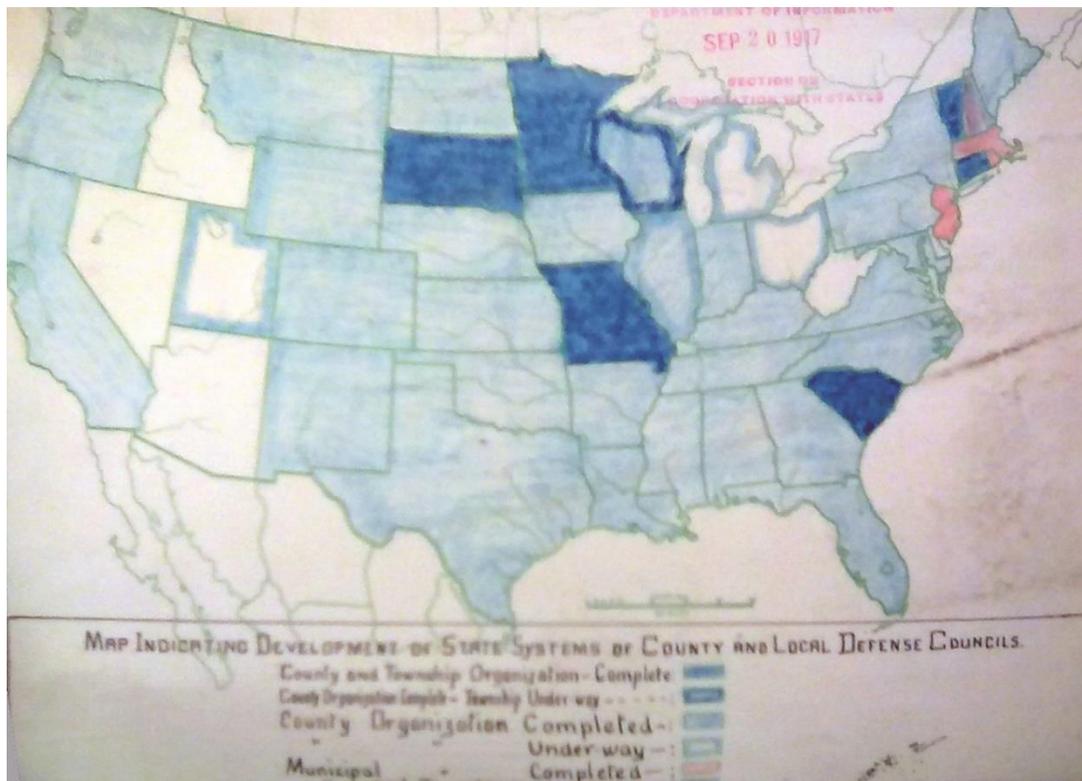


FIGURE 4.2. Colored Map of Defense Councils in 1917, (Map provided by the North Carolina State Archives).

These regions marked extensive strategic zones across the state. Charlotte held the state's main army training ground at Camp Greene, Fayetteville contained Camp Bragg, Raleigh stood not

only as the capital of North Carolina but as the tank training grounds at Camp Polk, and Wilmington became the premier shipbuilding area for the EFC (Figure 4.3).



FIGURE 4.3. Image of Carolina Shipbuilding Company in Wilmington, NC circa 1918 (Photo by North Carolina State Archives).

The United States Government specifically looked to cities within North Carolina as training grounds for the entirety of the country. Edward S. Prezel’s (1993) article titled “WWI: Boot Camp in Charlotte,” includes a minor history of North Carolina’s involvement during the war effort, within which he writes,

In the summer of 1917, the United States government needed places to train large numbers of troops quickly. It looked to the South because of its warm climate.

The North Carolina cities of Fayetteville and Charlotte sent delegations to

Washington, D.C., and competed for the favor of officials in charge of locating the new camps (Perzel 1993:1).

The new camps became major hubs of activity during the war and produced vessels, materials, and bodies to sustain the Armed Forces and Navy.

The main task of the state's Defensive Council included the protection of its citizens, organizing industries such as: The Young Men's Christian Association/Young Women's Christian Association (YMCA/YWCA), the Red Cross, Food board, and enlistment rates.

Besides the many training camps, shipbuilding, and counsels, North Carolina sought to protect its coastline using new technology including radio. Several public radio and telegram stations along the coastline were intercepted by the local government and added to the growing chain of communication along the coast. Per the Committee on Public information, across the United States, "202 radio stations are operated by the Navy" (The Committee on Public Information 1917:1). Besides technology, the infrastructure of the state was also used during the war.

North Carolina became a beacon for volunteer work and enlistment in the Army, Navy, and Coast Guard from 1917 onward, the Defense Council compiled a list county by county of the number of Navy enlisted men within the state. The list outlines that "7,124 [individuals], including one hundred and ninety-eight women became part of the Navy either enlisted or reserved" (North Carolina State Archives 1920:4). The people of North Carolina provided their labor and lives towards the war effort, giving the ultimate sacrifice for the safety of their country and protecting the home front. While many troops traveled overseas, the coastline of defense

remained at a state of unease as it was only a matter of time before the dreaded U-boats crossed the ocean and relayed the damages conducted on the British Empire throughout the Great War.

### **Germany Responds**

While North Carolina prepared for attack, the German Naval effort continued its long going blockade of the British Isles and the Northern Sea. The Kaiser's lack of concern over the American situation is prevalent within his decision to push the unrestricted campaign. This campaign became popular due to the work of Imperial German Navy Admiral Henning von Holtzendorff, who argued for unrestricted U-boat warfare. Dirk Steffen in his article "The Holtzendorff Memorandum of 22 December 1916 and Germany's Declaration of Unrestricted U-boat Warfare" described the main guiding principles surrounding the German Admirals petition as;

Holtzendorff's arguments in favour of the campaign revolved around two key issues: first, that the progressive arming of merchantmen would offset any increase in efficiency and numbers of U-boats as long as they were forced to adhere to cruiser rules; and second, that the crop failure of 1916 would offer a unique opportunity to starve Great Britain into submission quickly (Steffen 2004:216).

The armament of merchant vessels threatening U-boats safety, and the possibility of putting an expensive and brutal war to a swift end appealed to the German command. Unrestricted warfare would allow for supply ships from neutral nations like Canada and the United States to be curtailed in the ordered blockade of the British Isles. Following careful calculations by the

German Imperial navy, the implementation of unrestricted warfare would produce a peace before the harvest of the summer of 1917 (Holtzendorff in Steffen 2004:223). Despite considering the political relation from America, the Central Powers continued with the campaign. The United States in the beginning of the war proved little concern in comparison to the main enemy to the German people, the vast British Empire, as the prevention of British trade and commerce remained the prevalent and main goal of the campaign (Dubbs 2014:5). For the remainder of 1917, the Germany Navy focused on European waters.

Within the following year since the war had continued on regardless of Holtzendorff's predictions, the German government considered the possibility of attacking the United States and Canada. With the invention of the cargo class of U-boats, submarines with a fuel supply could travel for thousands of miles above and below the ocean. The first test came from *Deutschland*, a U-151 type U-boat, which traveled all the way to the Virginias and "arrived at Baltimore, Md., on Sunday, July 9, 1916. The total distance from Bremen to Baltimore by the course sailed was about 3,800 miles" (Daniels 1920:17). Though friendly at the time, the crossing of the Atlantic Ocean marked a new era in submarine travel. Vessels like *Deutschland* were never meant to be outfitted for combat operations, they were designed for long distance trade. As the war progressed, the demand for submarines increased and cargo class U-boats were armed and repurposed.

Finally, by the Spring of 1918, several U-boats were equipped, ordered to sail, and passed through the dangerous waters of the North Sea into the Eastern Atlantic. Their orders were to cause as much damage to the "unsuspecting" Americans as they could. Although not explicitly stated, the deployment of raiding boats to the American and Canadian coastline served as a fear tactic and distraction from the main fighting in Europe, as well as the military decline of the

Central Powers. The first boat to make the long journey from Germany was U-151, the sister ship to *Deutschland*.



FIGURE 4.4. Captain Heinrich von Nostitz und Jänckendorff (Dufeil 2011:50).

These cargo submarines were stripped down and outfitted for war. Chris Dubbs describes the converted convoy class: “It finished converting its large merchant submarines for military operations. Labeled U-cruisers, with a cruising range of twenty-five thousand miles and able to sustain mission of ninety days or more” (Dubbs 2014:36). Piloted by Captain Heinrich von Nostitz und Jänckendorff (Figure 4.4), the boat began the long journey, armed with mines, torpedoes, and wire cutters.

### **Three Months of Terror**

By the end of May 1918, U-151 crossed into the Atlantic and piloted along the coastline of the United States. For the U-boat’s first month along the coast, it found little luck in sinking ships of value, spending most of the time hiding from patrols. Their first successful attack took place on

May 25, 1918, against three American ships, *Hattie Dunn*, *Hauppauge*, and *Edna* (Körner in Thomas 1928:295-297).



FIGURE 4.5. Körner on the deck of U-151 (Thomas 1928:287).

On June 5, 1918, the British steamer, *Harpathian* crossed paths with the submarine. Lieutenant Dr. Frederick Körner (Figure 4.5), an educated officer was interviewed by a popular American reporter Lowell Thomas (1928) after the war on his part in the American submarine effort. He states that after viewing *Harpathian*, the crew determined to sink the vessel under unrestricted warfare policies. Körner elaborated:

She was heavily armed, and therefore subject to torpedo attack without warning.

We submerged when we sighted her and ran under water to a point along her course where we could get a good shot. Our torpedo went on its way. A thud came with a dull metallic jar (Körner in Thomas 1928:318).

The crew aboard *Harpathian* took to their lifeboats as the ship began to sink at 36° 30'N., 75° 00'W. One worker had been injured in the explosion. In an act of kindness, despite sinking the vessel without warning, the German crew took care of the injured and displaced:

We hauled the injured man, a Japanese, onto our deck, where our surgeon looked over him. He had a couple of cuts, scarcely more than scratches. A bit of iodine and adhesive plaster, and he climbed back into our own boat. We obliged the men in the boats with a tank of water, a few tins of bully beef to keep the edges off their appetites, and a heap of tobacco (Körner in Thomas 1928:318).

After sharing in their supplies with the crew, they were left to row towards shore.

Within a few hours, U-151 found another target off North Carolina. Around 3 p.m., American Schooner, *Ella Swift* sighted a submarine and within an hour of recording the location of the vessel, an unfortunate whaler encountered U-151 (Daniels 1920:44). American whaling ship, *Nicholson*, was stopped by the submarine and efforts were made to sink the vessel. “The master of the whaler urged the submarine officers to spare his ship saying that it would ruin him financially if the vessel was destroyed” (Daniels 1920:44). Continuing the tradition of treating the enemy nation with kindness, the whalers on Nicholson could continue their operation unheeded.

The final victim of the day was *Vinland*, an unsuspecting Norwegian steamer traveled up the coastline. The ship with its crew was stopped by the U-boat. Körner recorded the interaction between the merchant vessel and the hostile submarine:

She was the Norwegian steamer *Vinland* of Bergen, bound from Guantanamo to New York with a cargo of sugar. Our third sugar ship! The captain said he had read warnings against submarines in the Cuban newspapers, but had dismissed them as merely another of those Anglo-Saxon war rumors. His incredulity made him look somewhat sheepish now (Körner in Thomas 1928:319).

After checking the ship's papers and vacating the merchant vessel, the German crew placed explosives on deck and detonated them from a safe distance. *Vinland* sank at 36° 32'N., 73° 58'W.

The U-boat crew did not encounter another ship until three days later. Henry J. James, an American reporter, in his book, *German Submarines in Yankee Waters* (1940), recounts the first encounter between the two ships:

At 5:30 a.m., June 8, the U-151 captured its richest prize, the Norwegian steamship *Vindeggen*, 3,179 tons, loaded with six thousand bales of hides and wool, and two thousand tons of copper for the Allies. She was too valuable a prize to send to the bottom at once. A heavy sea was running. In an attempt to launch the starboard boat her Chinese crew capsized it, one of their number being drowned (James 1940:56).

Despite the single casualty, the crew of *Vindeggen* were treated as well as the other unfortunate sailors off North Carolina. Nostitz und Jänckendorff soon discovered that alongside the crew was a single family including a Norwegian man named Ugland, his wife, and their young daughter.

They decided not to force the entirety of the crew into lifeboats as they moved from the shipping lane to a safer area. Körner explains the logic of the decision:

The men, all veteran sailors, would find the trip ashore no great hardship, but with a woman and small child it was different. However, we had no intention of sending the people of the *Vindeggen* ashore just now. The steamer's cargo was too valuable; the copper, to be precise (Körner in Thomas 1928:319).

The time consuming and arduous process of unloading of the copper ingots needed hours, if not days to be completed. Together the two ships moved from the area towards safety.

Unfortunately, *Pinar del Rio* crossed paths with the caravan of ships on June 9. Upon spotting the ship approaching, Nostitz und Jänckendorff decided to attack before their prize could get away. The crew of *Vindeggen* was ordered back onto their ship but with a looming threat if they attempted to escape:

The Norwegian [Captain] did as he was told while we captured and sank the 2,504-tonner *Pinar del Rio*. Formerly the Villa Real of the Oldenburg-Portuguese line. She was another sugar ship (Körner in Thomas 1928:320).

The Captain on board *Pinar del Rio* made the decision to abandon ship with the crew as they were fired upon by the surfaced U-boat, "Captain John MacKenzie and seventeen of the crew cleared the ship which was rolling heavily in the seaway, followed by the mate and fifteen others in a second lifeboat" (James 1940:56). Before going into their lifeboats, a crew member managed

to obtain a photograph of the submarine from the deck of the ship (Figure 4.6). The kindness extended by the German crew evaporated with the merchant vessel. *Pinar del Rio* sank at 36° 16'N., 73° 50'W.

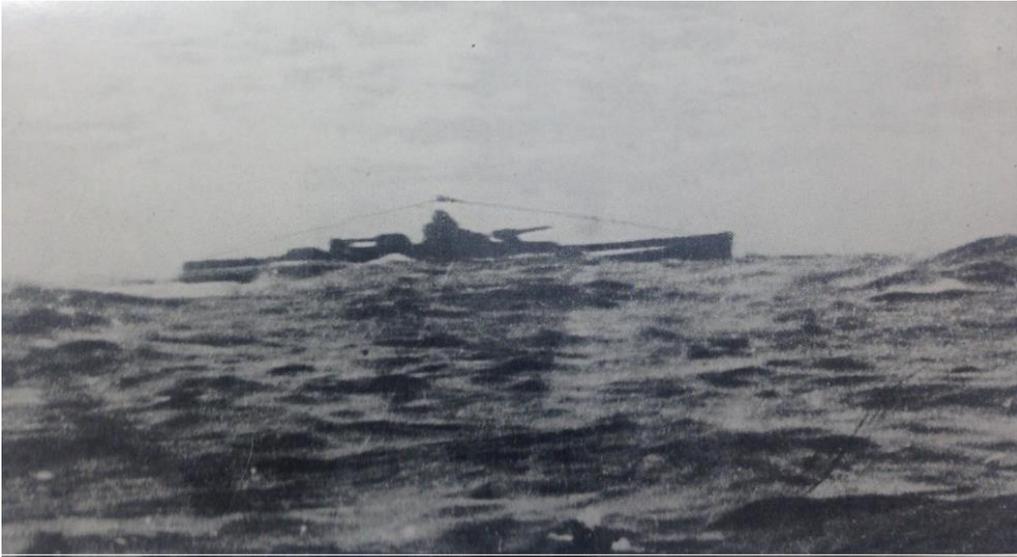


FIGURE 4.6. U-151 sailing, picture taken from the deck of *Pinar del Rio* (Photo courtesy of the United States Navy).

The two lifeboats quickly became separated in the swirling sea, with one drifting towards the coastline and the other further out to sea. James states that:

Captain MacKenzie's boat was picked up by a Norwegian fruit steamer early that evening and taken to New York. The mate's boat, which had become separate from the other, succeeded in reaching the shore at Manteo, North Carolina (James 1940:57).

After landing in North Carolina, the remaining crew contacted the local authorities to report the incident to the United States Navy. Unknowingly, the crew of *Pinar del Rio* reported on

*Vindeggen*, a fellow victim of U-151, as being a German ship working with the submarine (James 1940:57). The sinking of *Pinar del Rio* never became part of the official log of the ship, for whatever reason but other outlets of history recorded the tale of the ship and it is recorded by the United States Navy as part of war losses (Daniels 1920:139; Clark 1929:315).

After the clearing of the area, the submarine and the merchant vessel resumed their travel together. Mrs. Uglund and the toddler were permitted to venture inside the U-boat as the sea became too rough to subside in the lifeboats or onboard deck. The toddler enchanted the crew of the ship despite being held as hostages:

The child became the ship's darling. Her name was Eva. She gazed at the things around her with marveling eyes. Our sailors tumbled over themselves to please her to. The cook felt himself the chief personage in the entertainment given the young lady. He prepared cakes, candies, and dishes of canned fruits with whipped cream. The sailors fed the delicacies to the child with an unflagging delight. The tiny Eva was a very obliging mite. She tried to please her hosts by eating everything they gave her. She persevered in these good intentions until her stomach overflowed, whereupon Mrs. Uglund intervened and carried the tot away until she had recovered from the overfeeding. Thereafter our men were careful about what they gave Eva to eat, and contented themselves with bouncing her on their knees and such (Körner to Thomas 1928:321).

Pleasantries were shared between the two crews as they worked together to remove the U-boats ballast and replace it with the copper ingots. By June 10, the capture of *Vindeggen* came to an

end. The German crew placed explosives on the ship and raised the Norwegian flag as a friendly gesture to the Norwegian sailors they had bonded with (Körner to Thomas 1928:322). The ship sank at 36° 25'N., 71° 29'W., while the Captain and crew watched. The Germans as a friendly act, played music for the Norwegians while keeping them tied to the submarine. Finally,

A topline was passed to the submarine which proceeded westward with its strong of lifeboats. Several of the German sailors attempted to entertain by bringing up mandolins and guitars, and singing old folk songs (James 1940:58).

As celebrations continued, the final ship to occupy U-151 sailed into the region.

Another Norwegian steamer, *Henrik Lund*, passed by the U-boat on its shipping route. Formerly known as the SS *Ryall*, (Figure 4.7), the ship unknowingly sailed close to the submarine and stranded party.



FIGURE 4.7. *Ryall* circa 1906 (Image provided by ShipIndex.org).

Körner reported the following on the interaction between the two ships:

The ship was the *Heinrick Lund* of Bergen, Norway. She was bound from Baltimore for Buenos Aires with a cargo of coal, engines, and engine parts. Her skipper, Captain Kaltenborn, asked for permission to rescue his belongings before the *Lund* was sunk. “I have,” he added, “a few bottles of champagne and beer, and also some newspapers that tell a lot about your boat.” He got instant permission (Körner to Thomas 1928:322).

The German crew enthusiastically shared the beer, champagne, and American newspapers with the crew of the *Henrik Lund* and *Vindeggen*. Körner discovered that some of the Norwegian crew attended the same naval events as he did in his early career in the German Navy. Captain Axel Kaltenborn later recounted his experience to the press:

The commander was polite in his manner, all the time I was on board, two hours, and said he was sorry he had to sink my ship. ‘War is war, and I must carry out my duty,’ he said (Kaltenborn in Clark 1929:91).

As the day passed and the supplies ran low, the mingling crews decided to separate:

The usual bombs were placed aboard the *Heinrick Lund*. Von Nostitz had promised the *Vindeggen*’s crew he would tow them to port. He intended to keep

his word. The string of lifeboats from the Lund were added to those of the *Vindeggen* (James 1940:59).

In the last polite effort by U-151, the two Norwegian crews were towed to safety. After the successful month of June, U-151 ventured along the Northern States coastline before deciding on returning home to face the debilitating final push of the war effort in European waters.

U-140, a similar large ship to U-151 and part of the U-140 class after it was named slipped into the Atlantic. Commanded by Waldemar Kophamel (Figure 4.8), a famous U-boat captain of the era and previous Captain of U-151, U-140 only carried torpedoes on board. “Her assignment was to intercept large transports and cargo-carriers, leaving smaller game for her associates” (James 1940:125). U-140 moved as swiftly down the coastline as its predecessor, U-51, arriving in North Carolina only two months after the sinking of *Harpathian*.



FIGURE 4.8. Korvettenkapitän Waldemar Kophmel (Dufiel 2011:35).

On August 5, 1918, an American three-masted schooner by the name of *Stanley M. Seaman* became the unfortunate victim of the U-140. When Kophamel signaled for the ship to

halt and send its papers, the captain and all its seven crew members exited the ship and piled into a motorized raft.

The U-boat intercepted them. Upon learning they were without food or water, the captain of the submarine admonished them for their haste, and towed them back to the becalmed schooner. He suggested they use the motor boat, and provision it adequately for the trip ashore, some hundred and ten miles away. After three days they were picked up by a British steamed and taken to Newport News, their recent departure (James 1940:116).

After being promptly scolded by the Captain, the crew of *Stanley M. Seaman* ventured off to safety after the loss of their ship at 34° 59'N., 73° 18'W.

Within the next twenty-four hours, U-140 encountered two more vessels within the immediate area: *Merak* (Figure 4.9) and *Diamond Shoals Lightship* or *Lightship #71* (Figure 4.10). Both American ships, *Merak* being an ex-Dutch merchant vessel and *Lightship #71* stood as an unarmed vessel providing necessary light to ships passing through the dangerous shoals off North Carolina.

The U-140 crept in close to the American shore, coming to the surface at 1:40 p.m. August 6, just off Diamond Shoal Light vessel No. 71. The American steamship *Merak*, 3,024 gross tons, was proceeding down the coast about four miles away, loaded with coal for Chile (James 1940:116).

*Merak* noticed the approaching U-boat, whether warned by the nearby lightship or seeing it, themselves, the ship took off, fleeing from the enemy ship:

The *Merak* altered her course for the shore, steering in a zig-zag manner. When thirty shots had been fired at her by the pursuing U-boat she hit hard and fast on the shoals. Her crew took to the boats. Seeing that the steamer was hard aground the U-boat turned its attention to the Diamond Shoal Lightship which was also unable to run away from her anchorage (James 1940:117).

*Merak* beached on the shoals at 34° 57'N., 75° 40'W. U-140 attacked the lightship, marking a new precedent for U-boat warfare in America.

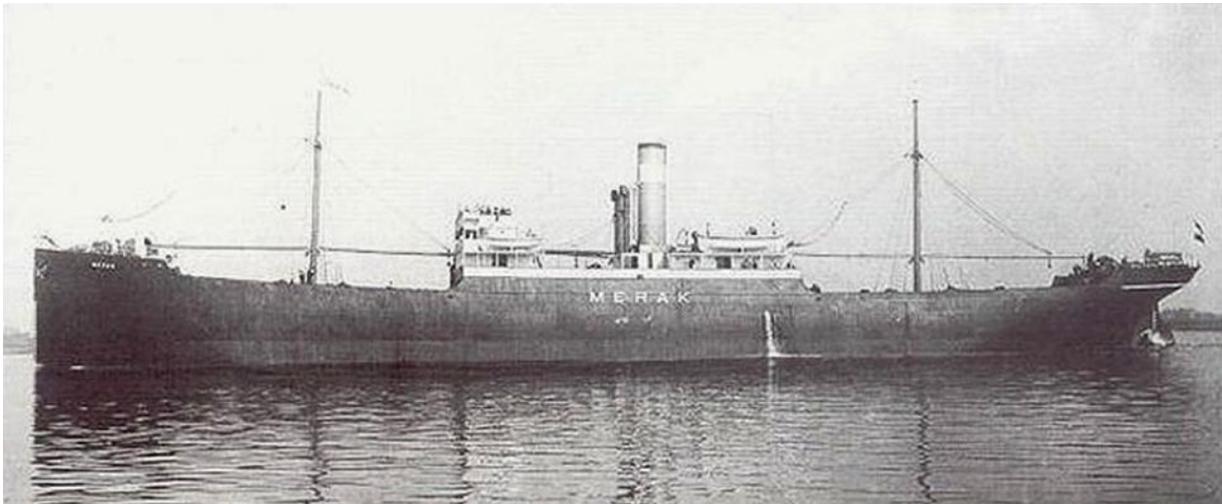


FIGURE 4.9: SS *Merak* (Photo Courtesy of George Converse).

Before, helpful ships and landmarks such as lightships and lighthouses were out of bounds within the forethought of war time sinking. By keeping the lightships in position, the U-boat itself benefitted from their resource in guiding through treacherous waters. Lightships themselves

were also unarmed and non-hostile. Despite this, U-140 continued to fire from the surface at the tethered ship as an act of revenge for reporting and witnessing the sinking of *Merak*.

The U-140 approached within 150 yards of the lightship before firing. The crew had already made preparation to leave in the event they were shelled (James 1940:117).

Lightship #71 sank to the ocean floor at 35° 05'N., 75° 10'W.



FIGURE 4.10. The first *Diamond Shoals Lightship*, 1897 (Image by the National Archives, Washington D.C.).

After the double sinking of the *Lightship #71* and *Merak*, U-140 chased the nearby British steamer, *Benleuch* to no avail (Daniels 1920:77). The crew of Lightship #71 claimed that gas canisters had been launched at the unarmed vessel, creating an air of panic along the coastline.

One man claimed,

Shells fired at the Diamond Shoal Lightship contained a yellow gas, and concluded that an attempt was being made to gas the crew. He stated that regular shells fired by the U-boat were smokeless (James 1940:117).

Thousands of North Carolina residents wrote to the Government asking for gas masks to be supplied to them in the event of chemical warfare. However, untrue as the attack may be, the mass hysteria caused by these claims also included the report of the gassing of an island off North Carolina's coastline.

The commandant of the Sixth Naval District at Charleston, South Carolina, reported that a U-boat had attacked by gas the coast guard and lighthouse crews on Smith Island off the coast of North Carolina on August 10 (James 1940:117).

However, this remains a false accusation as U-140 only carried torpedoes and standard ordnance shells. War time hysteria led to a mass panic with people in coastal communities asking the Government for gas masks (Dubbs 2014:68). The submarine continued to linger within North Carolina waters but put the vessel and crew at risk.

By August 10, the American destroyer U.S.S *Stringham* received an SOS signal from the Brazilian steamer, *Uberaba*.

S O S 36 N. 73 W. Help. We are running extreme danger. We are being attacked.

Lat. 36 N., long. 73 W. S. D.Z (Daniels 1920:79).

U.S.S *Stringham* sailed to the aid of *Uberaba* and proceeded to drop fifteen depth charges on the enemy submarine, seriously impaired the operation of U-140 (Daniels 1920:79). All ships involved escaped the incident without any further damage to either party. After the war ended, *Uberaba* visited the United States in 1919 and;

a request was made by the officers and men of the ship from the Brazilian naval attaché at Washington [DC] for permission to present to the officers and men of the U.S. destroyer *Stringham* an American flag in silk and a silver loving cup brought from Brazil to express their heartfelt esteem for the timely succor given and to strengthen the bonds of confidence and affectionate gratitude between the United States and Brazil” (Daniels 1920:79).

A happy anecdote in the overall history of a brutal and violent war, the crew of U-140 were not nearly as fortunate and continued to try to carry out their wartime mission. The submarine made one final attempt to attack a vessel within North Carolina waters on August 13. The American destroyer U.S.S *Pastores* recorded the attack in the ships war diary:

At 5:43 p.m., G.M.T., the officer of the deck noted a splash about 2,500 yards distant, a little on the starboard quarter, and heard the report of a gun. With his glasses he discovered a large enemy submarine lying athwart our course 6 or 7

miles distant, a little on the starboard quarter, and firing at this ship, apparently with two guns. From size of splash it appeared that these guns were of about 6 inches in caliber. Went to battle stations and commenced firing at submarine at extreme range with armor-piercing shell at 5:46 p.m., G.M.T (*Pastores* Crew to Daniels 1920:79).

U.S.S *Pastores* fired fifteen shots at the enemy submarine before U-140 attempted to dive and evade further damage.

Surviving the attack, Kophamel made the decision to return home after refueling. The depth charge damage combined with the shellfire put the submarine out of commission, even with a capable crew.

Her gun crew were the best in the German navy. With another man in command other than Waldemar Kophamel it is quite probable the U-140 would never have survived her strafing by the *Stringham* (James 1940:125).

Like U-151, U-140 joined in the last months of the European war effort. The final ship of interest journeyed not long after U-140. Evading any indication by British patrols, U-117 (Figure 4.11), silently made its way into North American waters. Piloted by Kapitänleutnant Otto Dröscher (Figure 4.12), U-117 hauled mines and torpedoes, being a strictly mine laying vessel itself. U-117 began sinking fishing vessels off Chesapeake Bay and New England, while simultaneously leaving deadly mine fields for merchant and military ships alike to unfortunately find and

become victims of. Like U-140, the mine laying U-boat made its way into North Carolina waters in August of 1918.

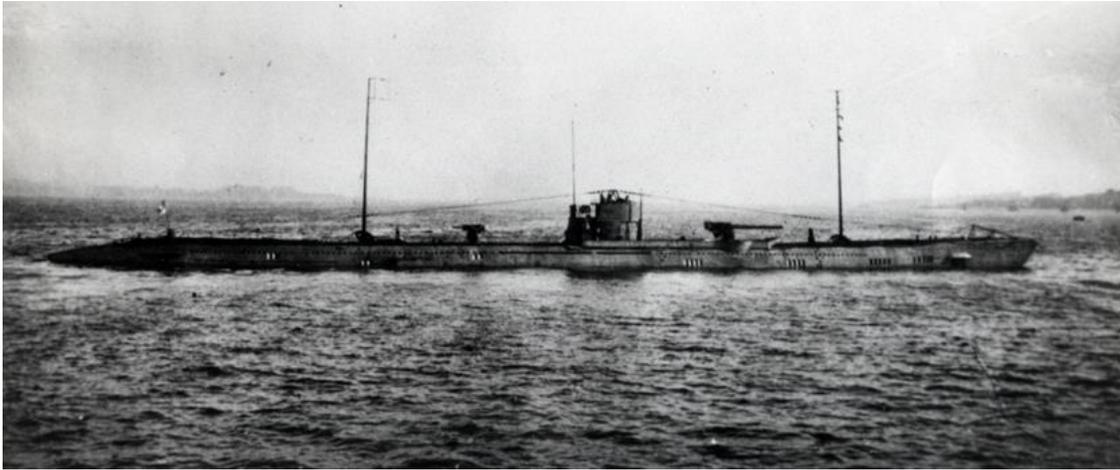


FIGURE 4.11. Image of U-117 sailing (Photo courtesy of the Outer Banks History Center).



FIGURE 4.12. Photograph of Otto Dröscher (Dufiel 2011:17)

At the beginning of the month, U-117 laid the final mines left onboard the ship across the popular travel region of Wimble Shoals on August 15, 1919.

Soon after the submarine sank its first ship with the use of its minefields. Though there is current contention in the historic record between local historians, sources confirm *Mirlo* struck at least one of the mines outside Rodanthe, North Carolina:

At 3:30 p.m. the next day the British tanker *Mirlo*, 6,978 gross tons, loaded with gasoline, struck a mine one half mile off Wimble Shoal buoy, the first victim of the U-boat's mines. The explosion burst one of the tanks, blew up the decks, and wrecked the engine room so that the dynamos operating the engine room telegraph and wireless were put out of commission (James 1940:140).

According to the sources used by the author, in attempt to breach the ship onto the nearby shoals, the captain of *Mirlo* struck a second mine. The ocean burned around the crew as they abandoned all hope for its survival. Meanwhile on shore, the Chicamicomico Coast Guard Station witnessed the explosion take place. The following events were recorded by the British insurance agency after the war via interviews with the lifesaving station crew:

At 4:40 P.M., August 16, 1918, the lookout reported seeing a great mass of water shoot up in the air, which seemed to cover the after portion of a steamer that was about seven miles E. by S. from this station and heading in a Northerly direction. A great quantity of smoke rising from the after part of the steamer was noticed, but she continued her course for a few minutes, when she swung around for the beach and then headed off shore: the fire was now seen to shoot up from the stern of the steamer and heavy explosions were heard (Midgett 1919:1).

The Coast Guard crew of lifesaving station 179 sprang into action, coming to the aid of the sinking vessel. In their haste, *Mirlo*'s crew accidentally toppled over a lifeboat into the fiery waters below, leaving the six crew members onboard to cling to the sides of the overturned raft.

John Midgett reported to the insurance company that owned *Mirlo* the events that unfolded at the Coast Guard neared the burning vessel:

On arrival I found the sea a mass of wreckage and burning gas. There were two great masses of flames about one hundred yards apart, with the sea for many hundred yards covered with burning gas and oil. And in between the two great flames at times, when the smoke would clear away a little, a lifeboat could be seen bottom up with six men clinging to it, and the heavy swell was washing over the boat. With some difficulty I ran our boat through the smoke, floating wreckage, and burning gas and oil, and rescued the six men from a burning sea who informed me that many times they had to dive under the water to save themselves from being burned to death. All had been burned, but none seriously (Midgett 1919:1).

Despite the immediate danger, the lifesaving crew persisted in saving the remaining sailors from *Mirlo*. The other lifeboats sailed without their compatriots, however, the unharmed survivors sailed to North Carolina to be housed and fed, before being transferred with the remaining group to Virginia (Figure 4.13). Of the fifty-two crew members, thirty-seven survived the unexpected mining, making *Mirlo* the deadliest disaster of the First World War in the region.

Regardless of their act of heroism, the United States Government kept quiet about the events which unfolded until the end of the war as not to insight more panic over a sensitive region. After the war had concluded and the threat of U-boat warfare wavered, the Department of the Navy commended the crew of the Life Saving Station for their gallantry and courage (James 1940:143).



FIGURE 4.13. Crew of *Mirlo* rescued and transported to Newport News, Virginia (Image courtesy of the Outer Banks History Center).

In the 1920s, John A. Midgett, Zion S. Midgett, Prochorus L. O’Neal, Leroy S. Midgett, Arthur V. Midgett, and Clarence E. Midgett were awarded by the King of England for their service to the British crew members and bravery upon facing a dangerous wartime disaster.

After the tragic sinking of *Mirlo*, U-117 encountered a single vessel off North Carolina on August 17, 1918. This would be the first and last direct interaction between a submarine and a merchant vessel in the region during the First World War.

At 6:30 a.m. it [U-117] was sighted by Captain Sven Marcussen of the Norwegian bark *Nordhav*, 2,846 gross tons. A warning shot at 7 a.m. followed by two more which fell close by cause the *Nordhav* to lay to while the captain took the ship’s papers over to the U-boat. Because the ship was carrying a cargo of linseed oil for

New York the German commander decreed it must be sunk. Returning with a boarding crew the crew of the *Nordhav* were allowed twenty minutes in which to prepare to abandon ship (James 1940:144).

After the allotted time, bombs were placed aboard the bark and detonated, letting the wooden vessel sink at 35° 42'N., 74° 05'W. The crew of U-117 did not extend the kindness of towing the ship's crew offered by U-151, instead they were left to either being located by a ship or reaching the coastline hours away. The crew of *Nordhav* went adrift in their lifeboats for twenty-four hours before being picked up and taken to Boston (James 1940:144). Leaving the crew to fend for themselves, U-117 would not attack successfully attack another ship during the remainder of the war.

Captain Dröscher made the decision to return to Germany, leaving behind a minefield and memories of the destructive capability of submarines in low guarded waters. U-140 after being depth charged called for assistance from the crew of U-117 (Figure 4.14).



FIGURE 4.14. View of submerged U-117 (Photo courtesy of the National Archives, Washington D.C.).

Josephus Daniels (1920), recorded that, “On September 9 she went to the assistance of the U-140 which had been forced to call for aid because of a leak” (Daniels 1920:99). With depleted supplies and a need to aid a fellow submarine, U-117 and U-140 departed together for the German port of Kiel.

James speculated that U-117 was the most destructive submarine in the history of the east coast invasion, “With the exception of the U-152 that followed her to the American coast, the U-117 was the deadliest U-boat in American waters” (James 1940:151). With the combined minelaying and sinking effort, U-117 made a dent in the shipping of the area.

### **The War Ends and All is Quiet on the Eastern Seaboard**

By October of 1918, the war to end all wars finally saw an end in sight. Germany and Austria-Hungary could no longer hold power on the terrestrial and naval battlefield. On November 11, 1918, on the eleventh hour of the eleventh day of the eleventh month, the First World War ended, and a new era began. As penance for their supposed war crimes, Germany was ordered to surrender its remaining U-boats to the victors. In sheer irony, the United States received two of the submarines used to terrorize their home front: U-117 (Figure 4.15) and U-140. The Naval Department received the ships a year later only to discover that U-140 (Figure 4.16) had been so badly sabotaged by its crew.

The U-boat would never sail again and instead studied for the material that remained prevalent to US interests, like the submarines below (Figure 4.17). U-117 after heavy repairs would sail again for a victory cruise across the east coast. Sailed by a German crew, instead of attacking America, U-117 sought to raise money to pay off the increasing war debt brought on by the First World War.

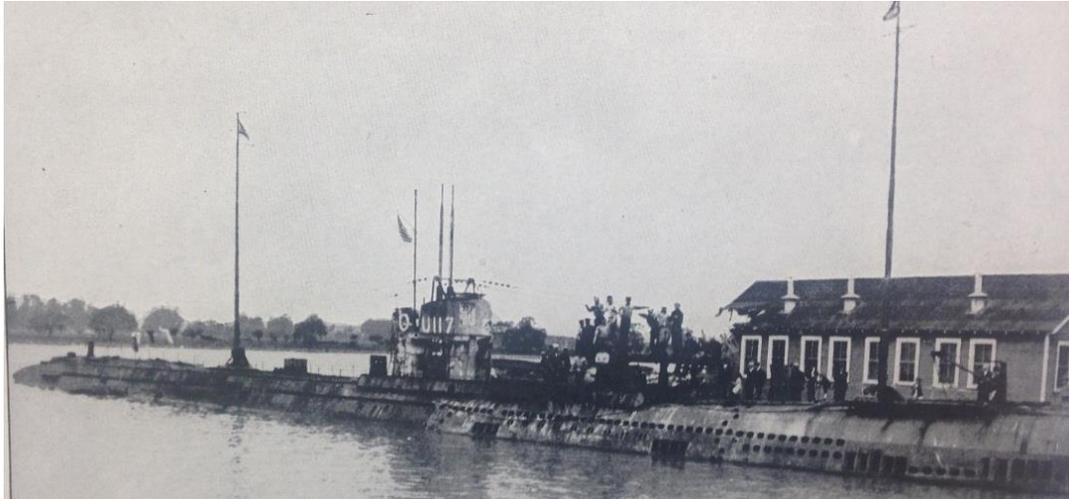


FIGURE 4.15. U-117 docked outside of Washington D.C. (Photo courtesy of the United States Navy).



FIGURE 4.16. U-140, at a pier at the Philadelphia Navy Yard, Philadelphia, Pennsylvania, 1920 (Photo courtesy of the National Museum of the U.S. Navy).

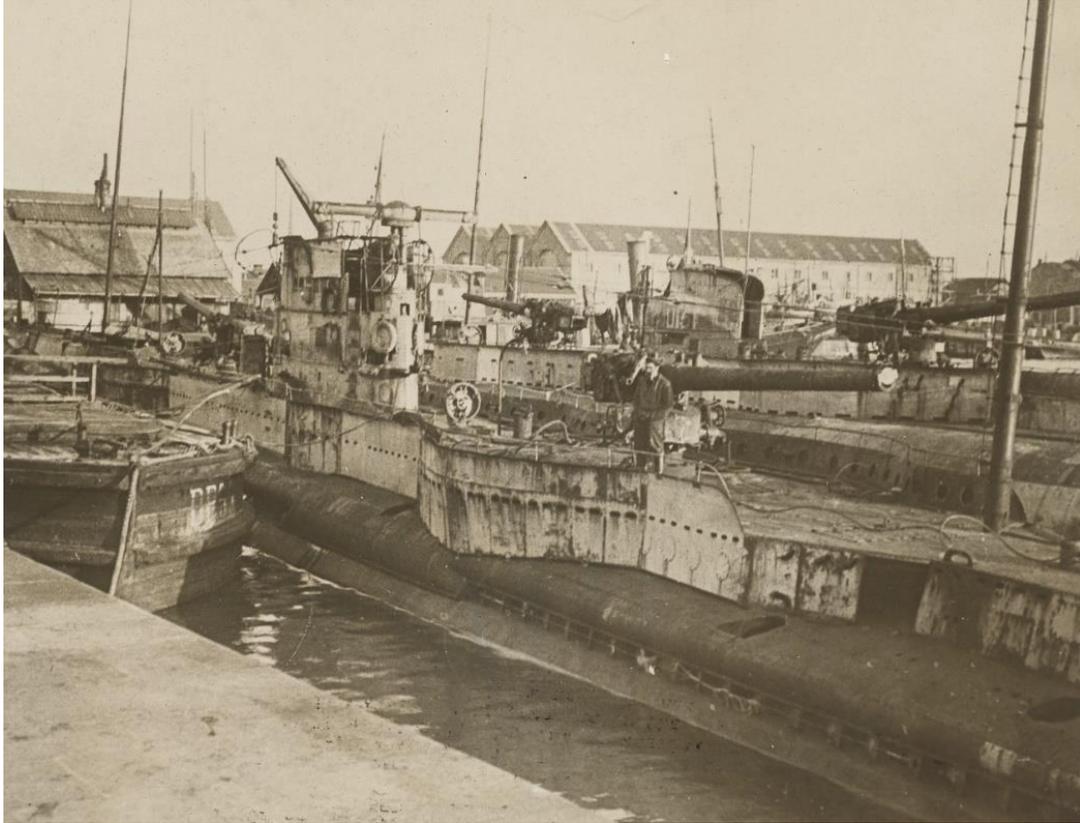


FIGURE 4.17. Retired *Deutschland*, U-156, and U-139 (Photo courtesy of the National Archives, Washington D.C.).

After 1920, however, the usefulness of these submarines ran out and the Government repurposed them as targets for naval aviation drills. The use of flight in combat had become instrumental in the First World War, though the application to fighting submarines via aerial spotting and bombing had only recently been considered towards the end of the war. The plan then was to experiment with different types of bombs to understand their future applications to aerial combat against armored ships. Dubbs states:

The airplanes would begin by dropping the navy's 163-pound antisubmarine bomb and progress to the Army's 2,000-pounders, the heaviest bomb that could

be carried by an aircraft. A board of army and navy officers would inspect the ships between attacks to record the damage done by each type of bomb (Dubbs 2014:170).

Advertisements for the event were made (Figure 4.18). Finally, after much deliberation, on July 1, 1921, U-117 and U-140 were broken up from aerial fire and sank outside of Virginia (Figures 4.19 and 4.20).

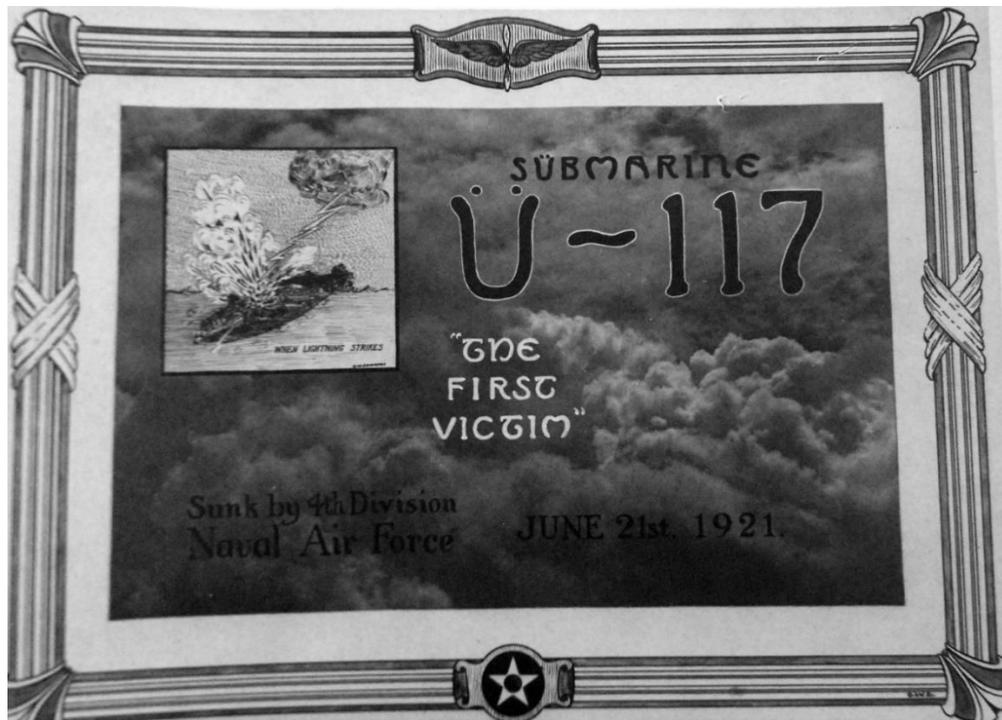


FIGURE 4.18. Anti-Ship Bombing Demonstration, 1921 (Photo courtesy of the Library of Congress).



FIGURE 4.19. U-140 and U-117 tethered and buoyed together before aerial bombing begins (Photo courtesy of the Library of Congress).



FIGURE 4.20. U-117 being bombed by US Navy F-5L aircraft (Photo courtesy of the National Museum of the US Navy).

## Conclusion

In the end, the memory of the east coast U-boats was quickly forgotten in time for the coastline to be ravaged again en masse during the Second World War. The lack of enthralling battles and blockade on the American coastline led many in charge to believe in the failure of the American U-boat campaign. Josephus Daniels in his many books written about the war described the German effort of attacking the American home front as useless:

The German campaign by means of submarines on the Atlantic coast of the United States, so far as concerned the major operations of the war, was a failure. Every transport and cargo vessel bound for Europe sailed as if no such campaign was in progress. All coastwise shipping sailed as per schedule, a little more care in routing vessels being observed. There was no interruption to the coast patrol which, on the contrary, became rather more active (Daniels 1920:141).

By quantifying the war efforts strictly against American vessels, Daniels counted only four ships off the coast of North Carolina (*Pinar del Rio*, *Stanley M. Seaman*, *Merak*, and *Diamond Shoals Lightship*). Daniels reaffirms his belief that despite the loss of vessels, the effort contained a lack of presence in American society at large.

There was no stampede on the Atlantic coast; no excitement; everything went on in the usual calm way and, above all, this enemy expedition of the Atlantic coast did not succeed in retaining on the Atlantic coast any vessels that had been designed for duty in European waters (Daniels 1920:141).

Despite the feelings given by the secretary of Navy at the time and the lack of recording the whole picture of the ten vessels in total sunk by the German's, the U-boats struck fear in the hearts of coastal citizens and merchant seamen. The orders given to the U-boat captains constituted a policy of engaging merchant vessels, not the overtaking of military craft or terrestrial boundaries. It should be noted that during this time Daniels under orders from President Woodrow Wilson downplayed the attacks on the coastline to keep the American people from panicking. The dismissal is a continuation of the wartime attitude of controlling public opinion and mass hysteria (though there were instances mentioned previously where this method did not work). However, despite this, the operations of U-151, U-140, and U-117 were forgotten until the advent of World War Two and the U-boat operation during the Battle of the Atlantic.

The differences between the two wars are startling in comparison, as the German officers had behaved almost gentlemen like during wartime. The combined kindnesses extended by Heinrich von Nostitz und Jänckendorff and Waldemar Kophamel contributed to the staggeringly low casualty rate along the coastline. James asserts that, "In several cases it is almost certain loss of life would have been greater had not the German officers radioed for ships to pick up drifting lifeboats" (James 1940:69). Between towing lifeboats inland and the calling for assistance of other ships, the German submariners treated the disenfranchised extraordinarily well in the time of unrestricted submarine warfare. The overall contribution of these submarines led to a series of remarkable stories of wartime friendships and notable acts heroism during the brutality and human cruelty of the First World War. Despite being forgotten, the Atlantic coastal raids serve as an interesting and important anecdote in North Carolina's coastal history.

## **CHAPTER FIVE: MAPPING AND UNDERSTANDING THE BATTLEFIELD**

### **Introduction**

One of the goals of this thesis is to determine the geographic boundaries of the battlescape off North Carolina. John Wagner's work, which this study's framework is based on, provided a methodology for determining a boundary for the World War Two battlefield using information gathered from shipping lanes and records of interaction off the coastline. The most important procedure introduced within his thesis is the analysis of data collected for patterns in attack and centrality of interactions within the period in relation to the known sinking location of the ships themselves.

From his historic data collection, Wagner determined the pathways of the battlefield and the overall arching trends leading to the manufacture of a highly accurate rendering of the Battle of the Atlantic. Although the analysis of geographical boundaries is to be determined within a later chapter, the results of this study include the reproduction of maps from the known sinking locations of all ten vessels previously mentioned and documents surrounding other lethal activities (such as mine laying). Based on the information from the visualization of the data, areas of high activity can be determined, and key patterns derived to establish a firm conclusion on the location of the battlescape and the most effected individuals within the conflict.

The other portion of this chapter completes the statistical analysis needed for the final battlescape analysis. This displays all instances of interactions between combatants and non-combatants, the typologies of vessels within the conflict, nationalities of those involved, and destruction caused. This section is split in two sections; ship type analysis and frequency and events. The statistical data is also compared to the work conducted by Wagner on the Second

World War. It is important before assessing the battlescape that elements of the conflict answer the remaining secondary questions posed in previous chapters.

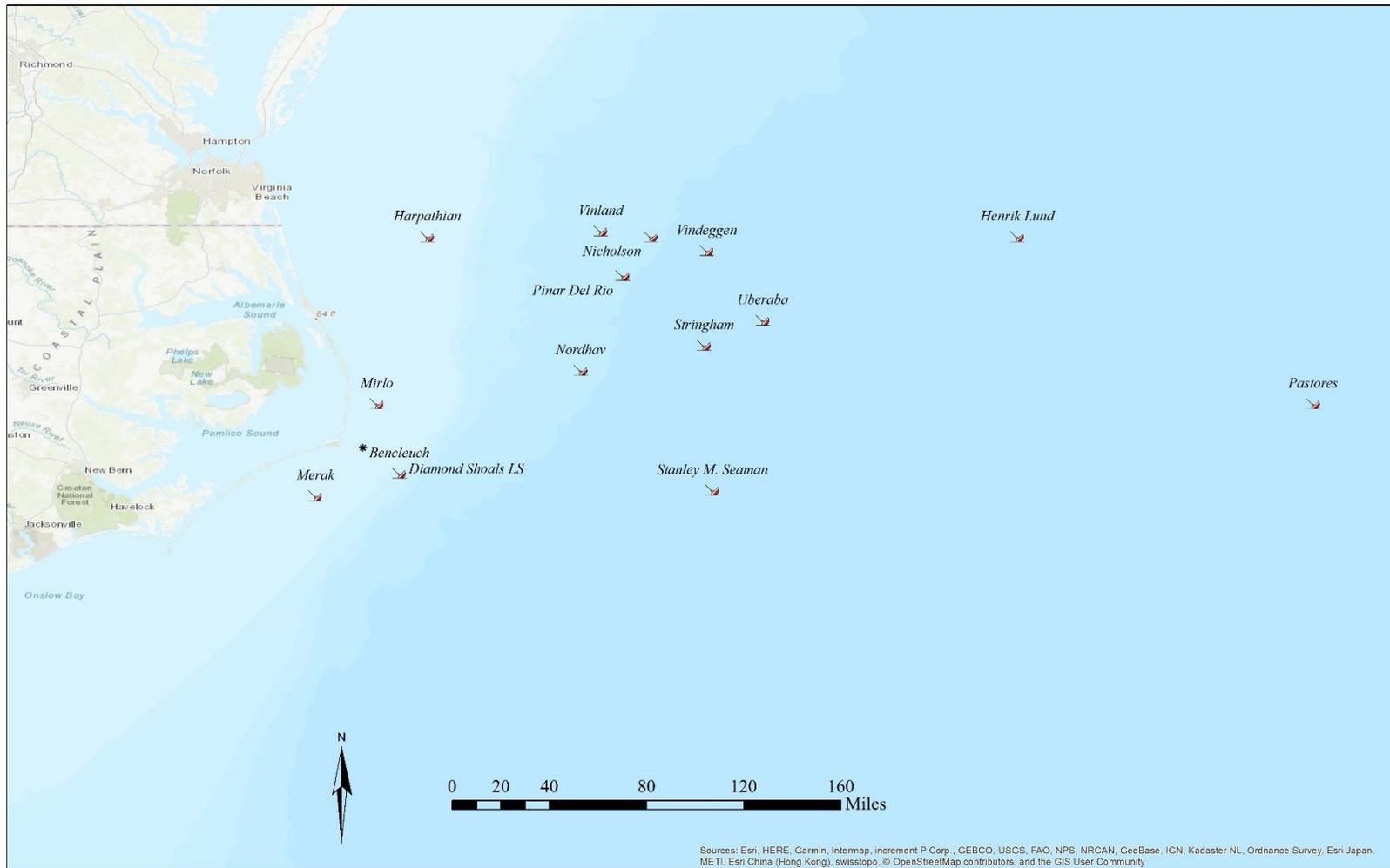
### **U-Boat Paths**

The U-boat attacks during the First World War began in late May of 1918, as explored in the previous chapter. The recorded activity starts with the crossing of U-151 in North Carolina waters as early as the beginning of June and ends with the return of U-117 up the coastline in mid-August. Although three submarines crossed into the region, all followed dissimilar patterns of movement and attack, requiring each to be studied in both isolation and relation to one another.

### **Combined Map of U-Boat Operations**

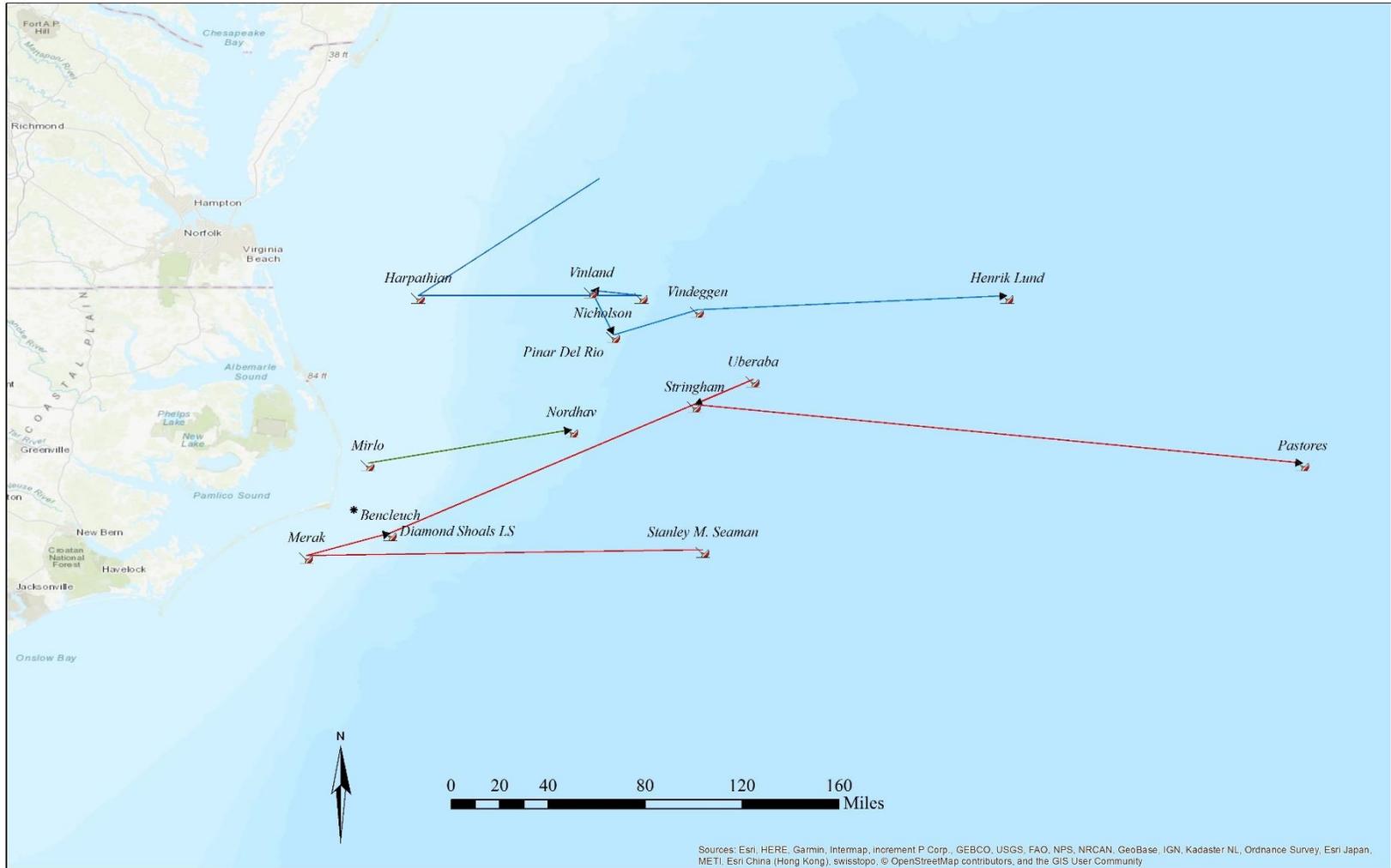
During the summer of 1918, several merchant ships fell prey to the operations of German U-boats off the United States eastern coastline. The pattern of attacks occurred over a three-month period and extended all the way from Newfoundland to the end of Buxton, North Carolina. Collectively ten ships fell victim to the operations of U-151, U-140, and U-117, as shown below (Figures 5.1 and 5.2).

The map below shows a clear distribution of two lines of attack, the inner coastal line and the mid coastal line, with the earliest of the attacks straddling the boarder of North Carolina and Virginia. The range extends from the Virginia border down towards Hatteras in the Pamlico Sound, only extending into a little over half of the states coastal waters. Despite rumors and acquisitions made by the head of the Sixth Naval District, no submarine attacked any terrestrial base nor did any make landfall.



\* The attack on Bencleuch and the sinking of Diamond Shoals Lightship were recorded at the same latitude and longitude by the US Navy

FIGURE 5.1. U-Boat Operations off North Carolina, as represented by confirmed losses and interactions (Map by author).



\* The attack on Bencleuch and the sinking of Diamond Shoals Lightship were recorded at the same latitude and longitude by the US Navy

FIGURE 5.2: U-boat operations as represented by watercraft interactions (showing direction entering and exiting North Carolina) (Map by author).

With all ships represented, the combined actions of the submarines show the impact of their actions on localized ships that became unknowingly the victim of the World War.

## **U-151**

Starting from the earliest attacks, U-151 became the most successful of the submarines to raid merchant shipping off North Carolina. The U-boat captured and sank five vessels within the course of five days, starting with the torpedoing of armed British merchant vessel, *Harpathian* on June 5, 1918. Within the following days, the submarine worked its way outward from the coastline chasing other ships along the way while escorting the valuable *Vindeggen*. The recorded sinking locations highlight the areas of activities as shown below (Figure 5.3).

The reasoning for U-151's path outwards and such a far extension from the coastline corresponds with the known historic narrative that following the capture of *Vindeggen*, the two ships traveled together outward to avoid rougher waters and patrols once the precious cargo could be unloaded. Under accidental circumstances the ships encountered the final vessel, *Henrik Lund* while out to sea. Overall, the directionality of movement shows a static, almost linear line of travel along a path meant to avoid detection and keep handle over the hostage situation.

Overall, U-151 proved to be a successful ship in terms of military tactics and victories. Of the five ships sank by U-151, three were Norwegian in origin (*Vinland*, *Vindeggen*, *Henrik Lund*), one was British (*Harpathian*) and one American (*Pinar del Rio*). Collectively the submarine destroyed a total of 15,736 gross tons and had the second highest casualty rate with one crew member from *Vindeggen* dying from falling overboard in rough waters (James 1940:56).

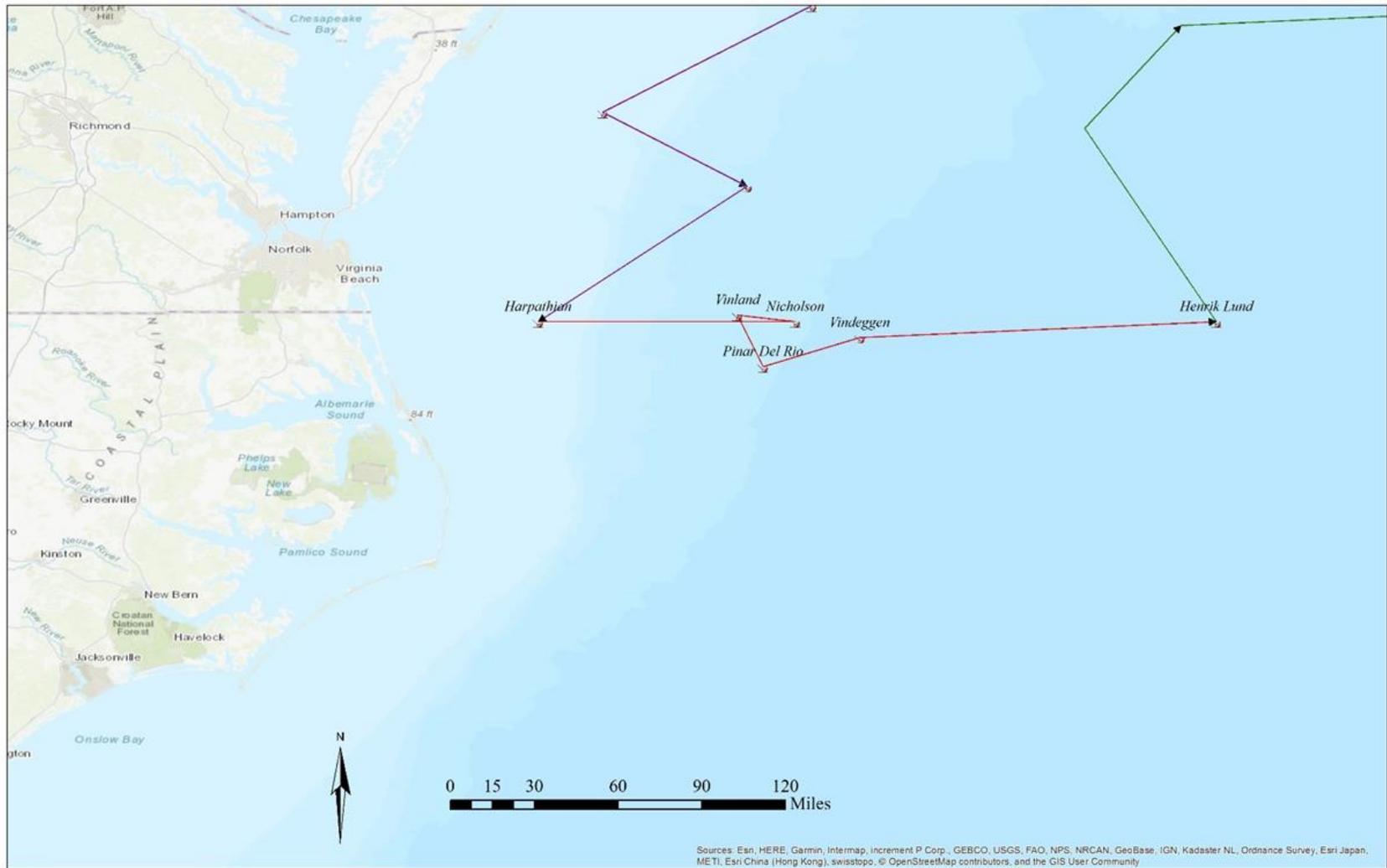


FIGURE 5.3. U-151 Operations off North Carolina (Map by author).

Most victims either warned of the predicament before being boarded and given enough time to clear the ship before leaving, however, some were given the special privilege of being towed closer to shore due to general hospitality and mutual regard for companionship and human life during war times. Although U-151 only ventured into North Carolina over the course of five days, the submarine left behind a significant impact on the coastline and its history, leaving a legacy for its predecessors to follow in.

### **U-140**

U-140 crossed into the Atlantic two months after the attacks from U-151 remained fresh in people's minds and was only second in the highest number of ships sunk by the Central Powers. U-140 started outward and worked closer to the official coastline of North Carolina. Extending towards Hatteras, the submarine encountered ships through a central shipping lane (*Stanley M Seaman*) and those closer to the shoals (*Merak* and *Lightship #71*). The submarine traveled the lowest as far as other enemy vessels were concerned, extending towards the mid-coastal region (Figure 5.4).

Starting with the encounter with *Stanley M. Seaman* on August 5, 1918, the submarine dared to venture closer to the coastline than its predecessor. Moving inland the following day, U-140 made a daring attack on Coast Guard related property by sinking *Diamond Shoals Lightship*. The placement of the attack on *Merak* and *Diamond Shoals Lightship* corresponds with the historic record, as U-140 targeted *Merak* first before going after the unarmed lightship for viewing and warning the unfortunate ship of the enemy submarine within the proximity. After sinking the ship used to guard others from the dangerous shoal, the submarine moved outward from the coastline back to the seemingly safer open ocean.

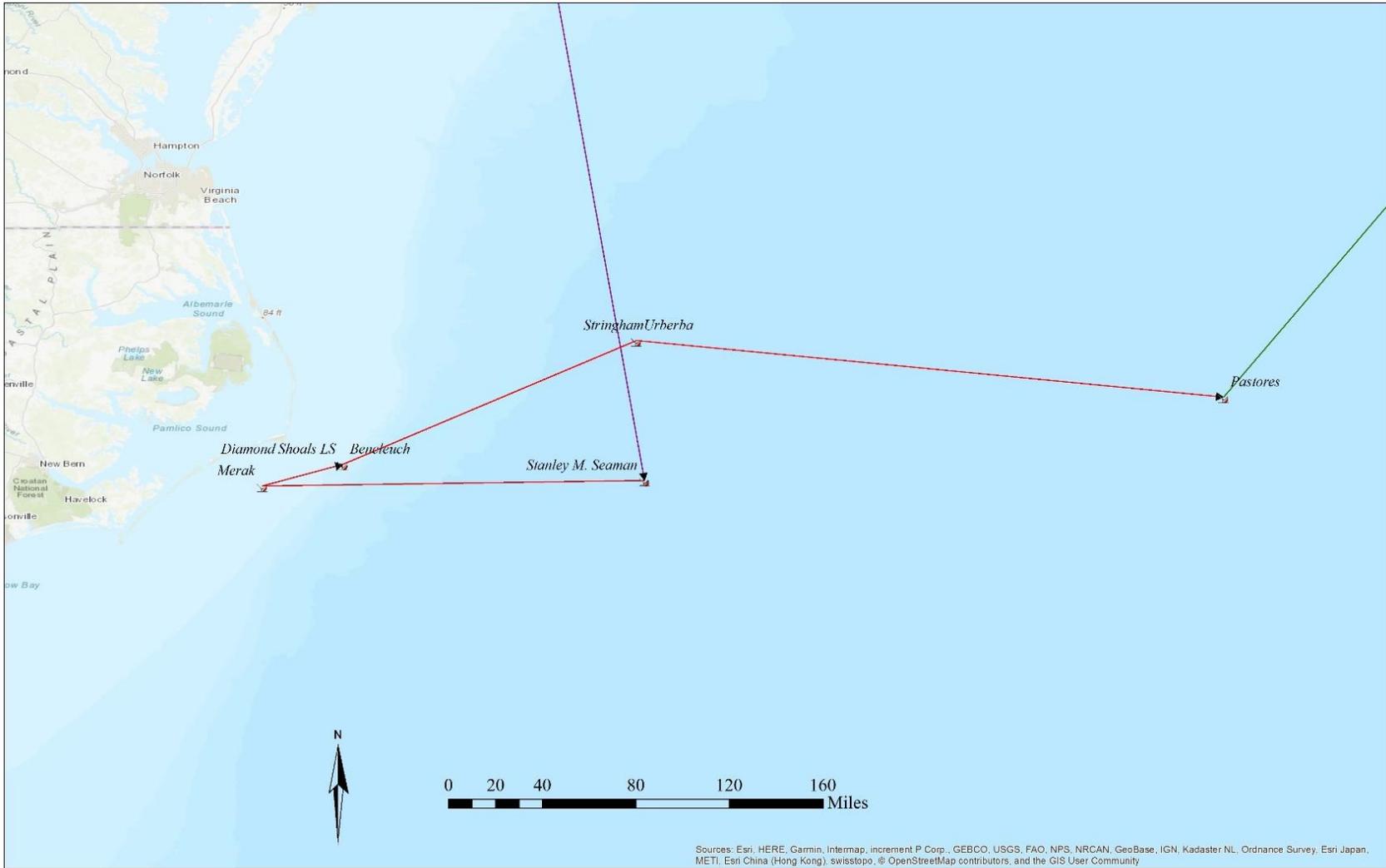


FIGURE 5.4. U-140 Operation Off North Carolina (Map by author).

The submarine sank all American vessels; one merchant (*Stanley M. Seaman*), one Coast Guard (*Lightship #71*), and one transferred to the Navy's merchant marine (*Merak*). No lives were lost in the attacks on these vessels and collectively the submarine destroyed 4,674 gross tons of shipping and governmental vessels. Though seemingly leaving a significantly low impact on the coastline as U-151, U-140 sparked fear in the hearts of North Carolinians, having attacked vessels close enough to the shoreline and impacting the local environment by destroying *Lightship #7*.

### **U-117**

U-117 is the final submarine demonstrated to be as highly destructive as U-151 and U-140 despite only sinking two vessels. As a minelaying vessel, U-117 sought to create a deadly trap for unaware merchant ships to fall victim to. After U-140 left the area, U-117 set the last of the mines the ship was carrying on August 16, 1918. The following day the British tanker, *Mirlo*, filled with petroleum struck the first mine of the day outside of Rodanthe, NC (Figure 5.5).

Following the sinking of *Mirlo*, the U-boat encountered the last victim of ships within North Carolina, *Nordhav*, as the submarine traveled outward from the minefield it had created. The movement of U-117 is also like that of U-151, moving from the coastline outwards. But instead of immediately targeting coastal shipping for attack, U-117 strategically placed the last of its mines along Wimble Shoals. Since the vessel's primary operation was minelaying, it makes sense than the historic data shows and equivalent of remaining closer to the coastline.

U-117 proved to be the deadliest submarine of the three operating in Carolina waters. Having sank a British tanker (*Mirlo*) and a Norwegian merchant sailing vessel (*Nordhav*), U-117 had the second highest rate of destruction of shipping with an Allied loss of 9,824 gross tons.

The submarine also had the highest casualty rate with seventeen crew members aboard *Mirlo* perishing to the flames and explosion following the ship striking two mines. Though U-151 and U-140 offered aid to the victims of their attacks, U-117 did not extend as many pleasantries to the crews of *Mirlo* and *Nordhav*, remaining callous during wartime.

### **Minefields**

Encounters between ships were not the only interactions off the coast. As U-117's crew made their way down the coastline of Canada and the United States, the Germans carefully placed sea mines in strategic areas, hoping for them to contact an enemy vessel or to hit something of importance before being discovered by United States patrols or washing to shore. According to the United States survey post World War One, there were ten mines placed off Wimble Shoals (Daniels 1920:138). Both sides during the war (Captain Drösher and the United States Navy) created their own interpretation of how the minefield operated off Wimble Shoals, offering two vastly different conceived constructions of its operation and placement. The interpretations provide interesting insight into both Central and Allied Powers operations during and after the war.

### **Drösher's Minefield Interpretation**

During his time as Captain of U-117, Otto Drösher kept an extensive journal of events that took place and even created maps of the distance traveled and any activities involving mines. As requested by the Germany Navy, Drösher provided extensive details of his location within his reports. The map of his mining activities (Figure 5.6), became part of war reparations along with his diary and torpedo logs.

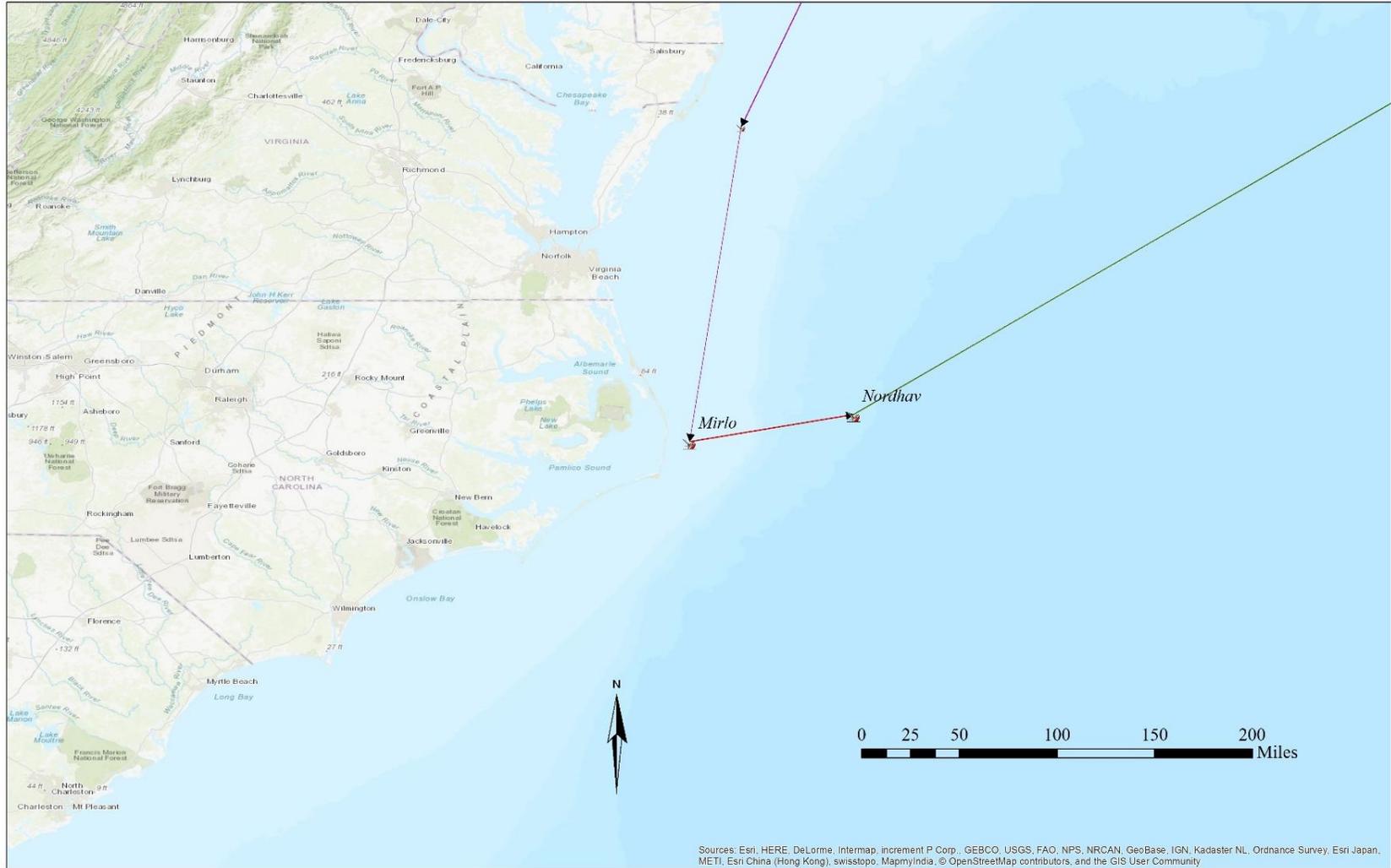


FIGURE 5.5. U-117 Operations Off North Carolina (Map by author).

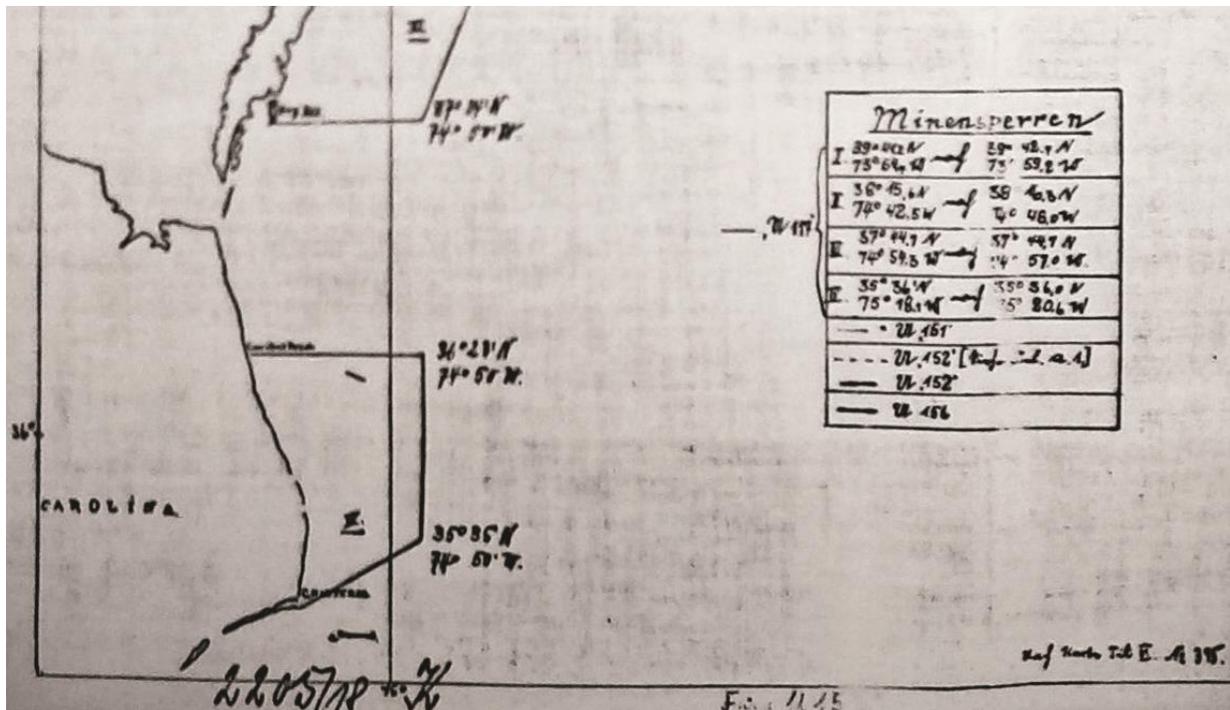


FIGURE 5.6. Drösher's map highlighting North Carolina (Map provided by the National Archives, College Park, Department of Defense, Record Group 242, Box 2).

As seen above, the maps articulate focused areas and give exact points of the range of the minelaying activities off the coastlines. Not only that, but Drösher includes a legend with additional coordinates of mines for the different areas. The coordinates may be inaccurate due to the process of measuring the point and transcribing it from a German sailor in 1918, however, bearing the possibility of differences in the modern and past translation of points, a minefield can be rendered (Figure 5.7).

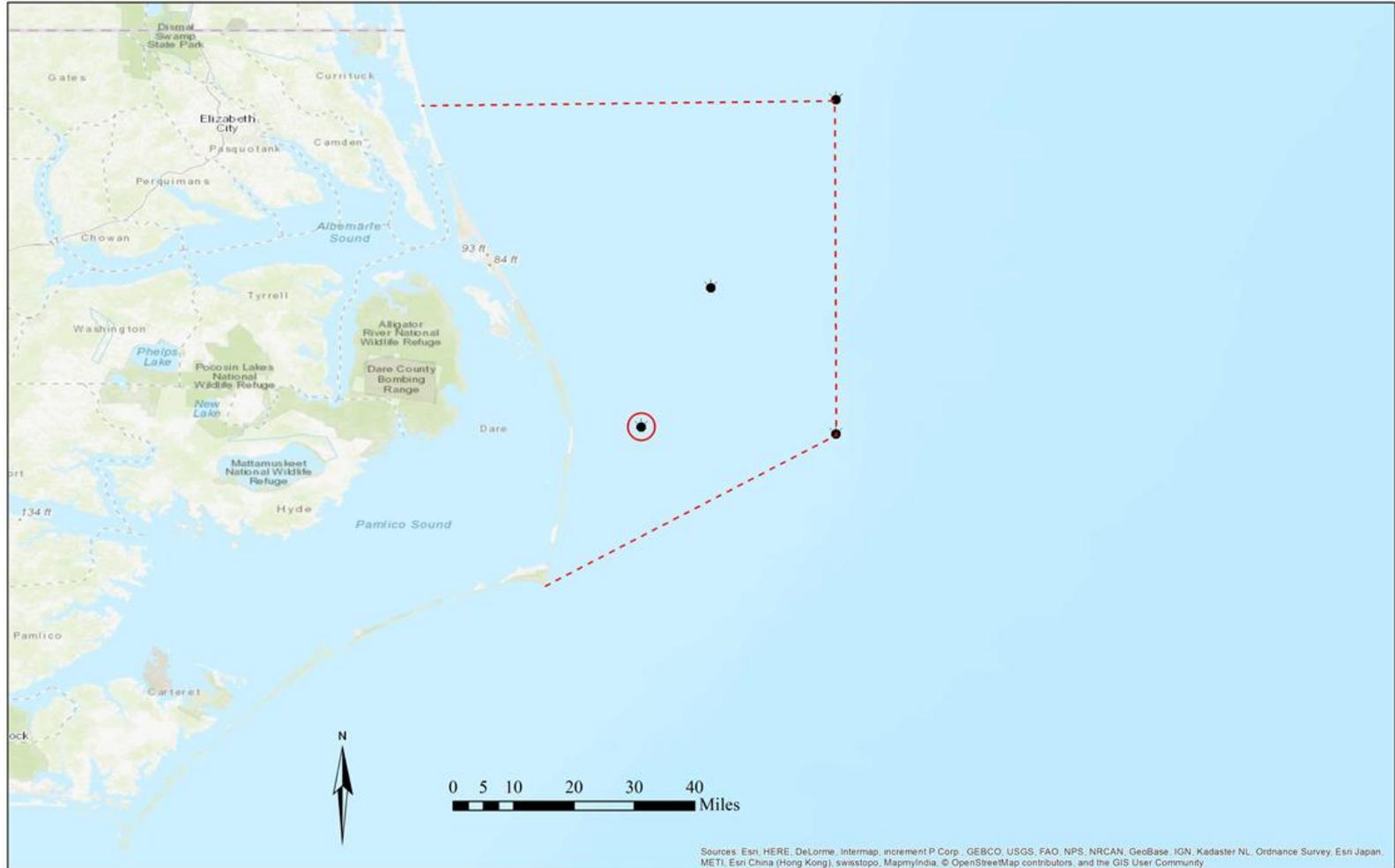


FIGURE 5.7. Drösher's Interpretation of Minefields Off North Carolina, including circle indicating the mine that *Mirlo* struck (Map by author).

## United States Navy Minelaying Interpretation

The United States Navy conducted a survey of wartime activities off the coastline and published their findings in 1920. They produced two charts based off the information gained from outside intelligence and activities conducted during wartime, including a chart on the minelaying activities conducted by U-117 (Figure 5.8).

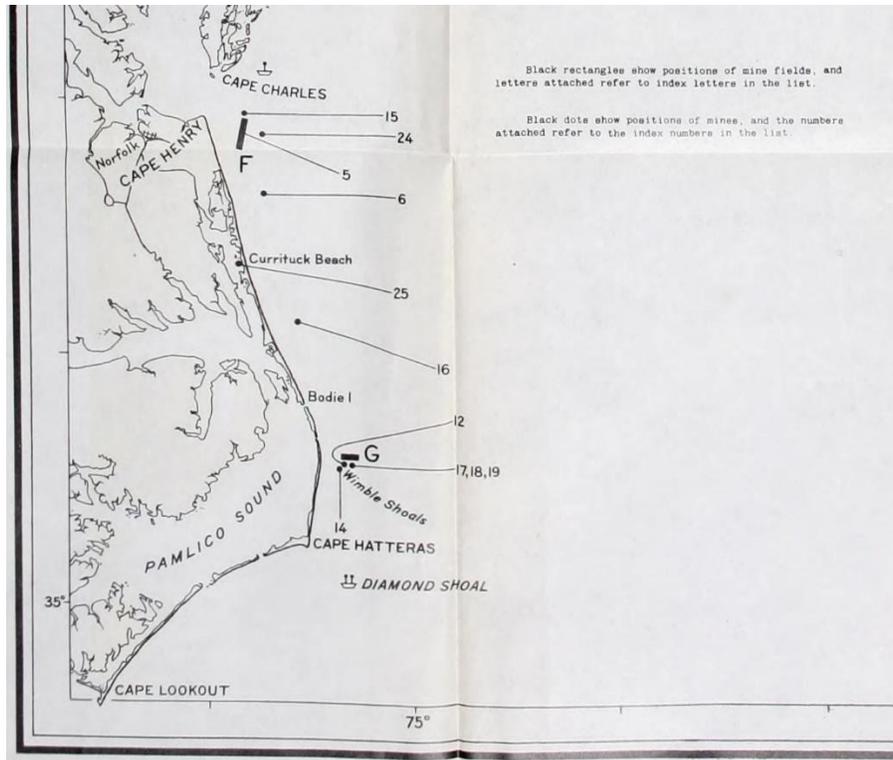


FIGURE 5.8. Highlighted Area of the Map of North Carolina from Chart No.2 (Navy Department 1920).

The map also contains a legend with outlines of where mines were found and with corresponding numbers and letters to represent the different mine zones. Zone “G” is the one indicated off North Carolina and contains several other mines, but instead of precise data given like Drösher, the Navy relies off common known places as geographic points. For example: the only known point for any of the mines within zone “G” are “Off Wimble Shoals” (Daniels 1920:138). With

little to no specified points a map of the mines was harder to accomplish but could be produced with the geographical area defined (Figure 5.9).

The minefield displayed below is much closer in range than the one Drösher produced, focusing on the area off Wimble Shoals, and includes the mine that *Mirlo* struck. The area strictly focuses on Rodanthe, North Carolina and contains a few mines. The reason for the lack of recording of the mines could be because the mines found were destroyed by USS *Teal* as they appeared closer to shore (Daniels 1920:138). They were not found in the original places they were placed, since the mines were free-floating. Their interpretation is largely based on the cluster of finds during and after the war as all ten mines were destroyed. Despite this, compared to one another both maps show wide variety in range and areas of interest. Although different they show the process of laying the mines and their intended path (Drösher) while compared to where they ended up and their fate (Navy). Together they produce a fascinating historical interpretation of a singular event that aids in the overarching geography of the battlescape off North Carolina. With the movement and mines examined the next part needed before continuing the spatial analysis is the statistics of the battlefield.

### **Statistics of the Battlefield**

Following the procession of events, shown below (Table 5.1), a general view of the battle may be obtained. The list contains the vessels name, date of the encounter, the type of interaction, the Nationality and type of vessel, and the position given upon sinking or encountering the enemy submarine.

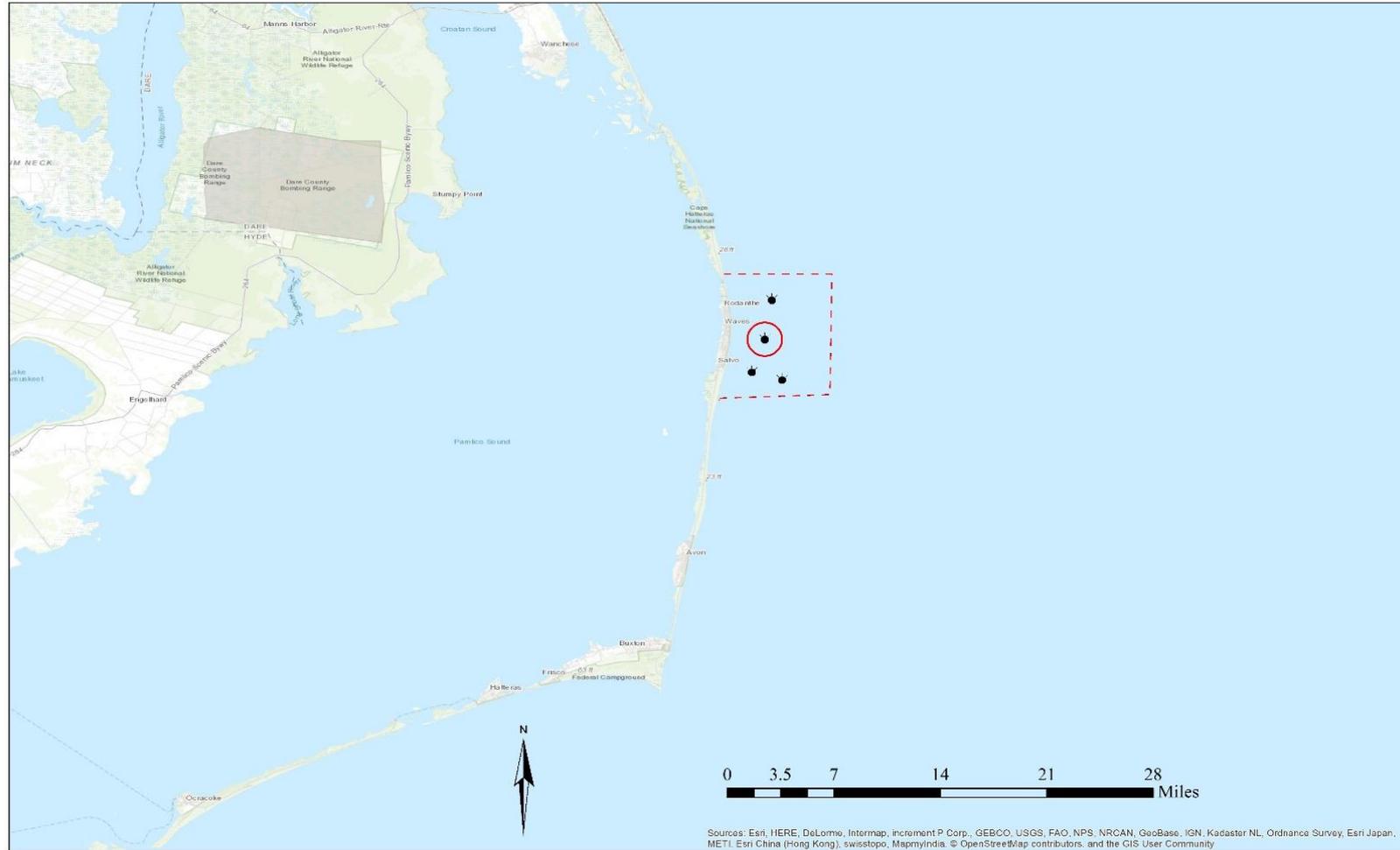


FIGURE 5.9. The United States Navy's Interpretation of the Minefields Off North Carolina, including circle indicating the mine *Mirlo* struck (Map by author).

Table 5.1. Full timeline of events during the First World War. (Sources: Daniel 1920; Clark 1929; Gentile 1992, 1993; Charles 1999; Heit 2012; Uboat.net 2016a, 2016b, 2016c, 2016d).

<b>Vessel name</b>	<b>Date of encounter</b>	<b>Interaction</b>	<b>Nationality/Type of vessel/etc.</b>	<b>Position given at time of interaction</b>
<i>Harpathian</i> (1913)	June 5, 1918	Torpedoed by U-151	British Steamer	36° 30'N., 75° 00'W.
<i>Nicholson</i> (unknown)	June 5, 1918	Stopped by U-151 but allowed to leave	American (Whaler)	36° 30'N., 73° 40'W.
<i>Vinland</i> (1906)	June 5, 1918	Bombed on the surface by U-151	Norwegian Steamer	36° 32'N., 73° 58'W.
<i>Pinar del Rio</i> (1895)	June 9, 1918	Gunned on the surface by U-151	American Steamer	36° 16'N., 73° 50'W.
<i>Vindeggen</i> (1916)	June 10, 1918	Bombed on the surface by U-151	Norwegian Steamer	36° 25'N., 71° 29'W.
<i>Henrik Lund</i> (1906)	June 10, 1918	Bombed on the surface by U-151	Norwegian Steamer	36° 30'N., 71° 29'W.
<i>Stanley M. Seaman</i> (1908)	August 5, 1918	Bombed on the surface by U-140	American Schooner	34° 59'N., 73° 18'W.
<i>Merak</i> (1910)	August 6, 1918	Bombed on the surface by U-140	American Steamer (formerly Dutch)	34° 57'N., 75° 40'W.
<i>Diamond Shoals Lightship</i> (1897)	August 6, 1918	Gunned on the surface by U-140	Lightship #71/C.G. Vessel (American)	35° 05'N., 75° 10'W.
<i>Benclench</i> (unknown)	August 6, 1918	Fired upon and chased by U-140	British (Steamer)	35° 05'N., 75° 10'W.
<i>Uberaba</i> (unknown)	August 10, 1918	Fired upon by U-140	Brazilian (Steamer)	35° 51'N., 73° 21'W
<i>U.S.S. Stringham</i> (1916)	August 10, 1918	Depth charged U-140	American (Destroyer)	35° 51'N., 73° 21'W
<i>U.S.S. Pastores</i> (1913)	August 13, 1918	Fired upon by U-140 and returned fire	American (Commissioned Merchant Steamship)	35° 30'N., 69° 43'W
<i>Mirlo</i> (1917)	August 16, 1918	Mines from U-117	British Tanker	35° 30'N., 75° 18'W.
<i>Nordhav</i> (1893)	August 17, 1918	Bombed on the surface by U-117	Norwegian Bark	35° 42'N., 74° 05'W.

The list shows all known events and actors within the First World War off North Carolina. In comparison to Wagner, the Battle of the Atlantic during the Second World War included 71 different vessels contributing towards 142 total events (Wagner 2010:138). There is a vast difference in action contributing the area of conflict between these two wars, but it is worthwhile

to compare the two to gain insight to the functionality of warfare during the early twentieth century.

### Ship Type Analysis

Stemming from the data collected are several charts detailing the general aspects of all the vessels within the area of conflict. In order to further understand who the main actors within the particular region were, a chart was compiled, detailing the nationalities that claimed ownership of the vessels as shown below (Figure 5.10).

### All Vessels By Nationality

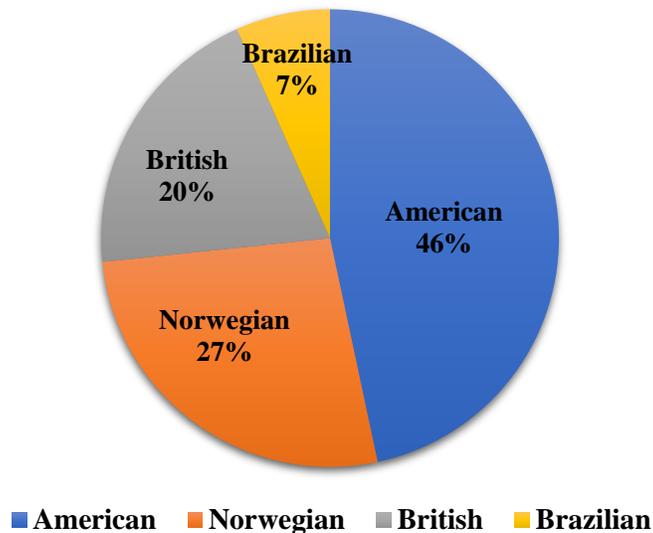


FIGURE 5.10. Chart of all vessels accounted for in North Carolina Waters (Chart by author).

America had the highest rate of interactions with the U-boats, with a total of seven ships (*Nicholson*, *Pinar del Rio*, *Stanley M. Seaman*, *Merak*, *LV #71*, *U.S.S Stringham*, and *U.S.S Pastores*), followed by Norway with four vessels (*Vinland*, *Vindeggen*, *Henrik Lund*, and *Nordhav*). British ships were third in the overall comparison with three ships (*Harpathian*,

*Bencleuch*, and *Mirlo*), and finally one vessel was Brazilian (*Uberaba*). Because of the geographical location, it makes sense that most of the vessels would be owned by Americans with a divide between merchant and military craft particularly shown. Two of the nationalities represented were neutral territories during the war (Norway and Brazil) that seemed to be part of the prominent shipping lanes operating off the United States coastline. These ships were unarmed and unsuspecting of any sort of confrontation despite the declaration of unrestricted submarine warfare in 1917, which considered them as legal prizes. The British operations were part of the war effort to resupply the country during wartime, as evident with the tanker *Mirlo* carrying petrol from the United States. The merchant ships were part of the survival of the country during the four-year period of conflict. Though questionable at first, the representation per nationality when placed within historic context makes more sense for certain ships to be predominate in the region.

In comparison to the Battle of the Atlantic, due to the larger scale of actors within the war there is a higher variation in nationalities. Wagner found that ships from America, Belgium, Brazil, Britain, Germany, Greece, Nicaragua, Norway, Panama, Yugoslavia, Latvia, and Soviet Russia contributed to the events of the war (Wagner 2010:141). Both wars show heavy involvement of American ships, 46 percent for the First World War and 55.63 percent for the Second World War (Wagner 2010:140). Since the actions took place within the coastal waters of the United States and being the nearest country to the conflict, America would be the heaviest player involved in the fighting. The second highest for the Battle of the Atlantic were British ships at 11.97 percent, and third with Panamanian ships with 9.89 percent (Wagner 2010:140). British ships are the third for the First World War at 27 percent over all events. Both datasets

show the emerging trade of the United States' coastline and the involvement of countries from Northern and Eastern Europe and South America.

The following chart displays distribution and number of certain types of vessels within the conflict, displayed below (Figure 5.11).

### Types of Vessels in All Interactions

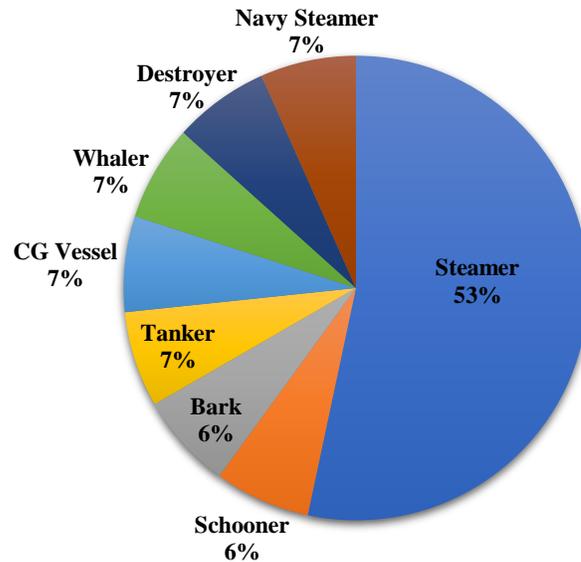


FIGURE 5.11. Chart of types of vessels overall in North Carolina waters (Chart by author).

Most vessels represented in the dataset were categorized as a steam vessel, either steam or screw steam, these include *Harpathian*, *Vinland*, *Pinar del Rio*, *Vindeggen*, *Henrik Lund*, *Merak*, and *Uberaba*. The variety of steamers were relatively popular with the advent of steam technology during the last century. The other ships were specialty vessels including: allocated type of work (whaler, tanker), mercantile rig (schooner, bark) or function (destroyer, Coast Guard vessel, commissioned merchant craft). They are all individual cases that had a reason to be within the designated area. One of the interesting dynamics between the type of ships was the presence of metal ships, as well as, wooden vessels. *Nicholson*, *Stanley M. Seaman*, and *Nordhav* all had wooden hulls and operated either as a specialized work ship or a merchant craft. The wooden

ships present in the historic and archaeological record potentially represent the slow shift in technology during the turn of the century. It is interesting to see the lingering shipbuilding tradition which continued to operate during this tumultuous period.

Compared to the Second World War, the diversity of ship types employed during such a chaotic period are fascinating. Wagner listed the types of vessels involved in the war as; armed trawlers, Coast Guard cutters, destroyers, merchant ships, passenger ships, tankers, tugs, and whale factory ships. The variety in ship types is related to the rise and use of merchant vessels as auxiliary vehicles in war, it is also a reflection of the ships operating off the coastline at this time. Interesting to note, there is no distinction in Wagner’s writing about wooden versus metal ships within his narrative of the war. This suggests that either they were not noticeable within the study or that they had been phased out over a period of twenty years, which merchants favoring metal-based watercraft.

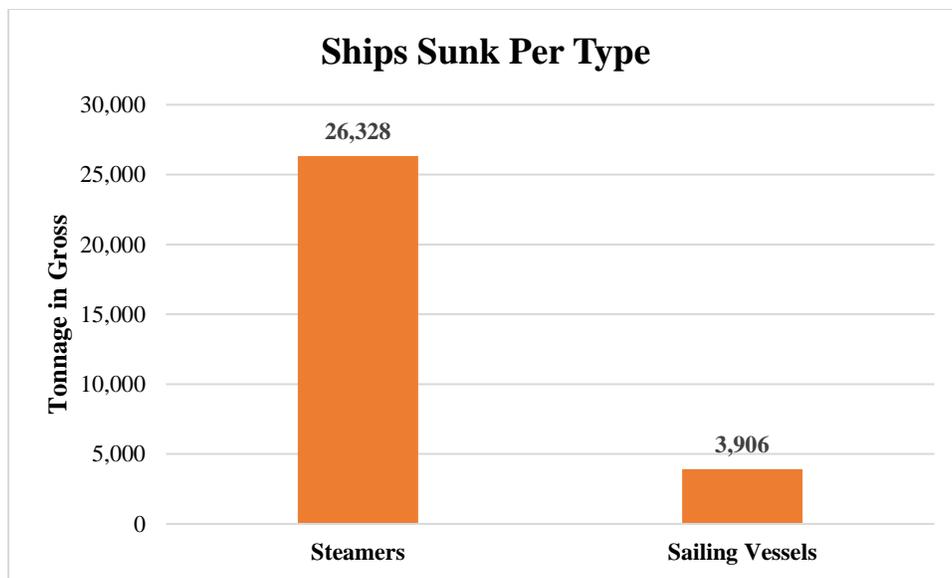


FIGURE 5.12. Chart of all ships sunk by U-boats, by their tonnage, and their type (Chart by author).

Following nationality and type, the next chart shows the division of ships sunk per type of vessel (Figure 5.12). The types of vessels fall under two categories: steamers (including

tankers and Coast Guard vessels) and sailing ships (barks and schooners). Related to Figure 5.11, most ships sunk were steamers based on the total tonnage of them within the dataset. Steamers themselves are larger than other vessels, for example *Merak* weighed 3,024 gross tons compared to Diamond Shoals Lightship weighing 590 gross tons. By far the largest singular vessel sunk during this short time period was the tanker *Mirlo*, weighing in at 6,978 gross tons. The loss of steamers contributed largely to the overall destruction brought on by the three U-boats.

The Second World War found a large amount of tankers and merchant vessels targeted by the Axis powers, 146,293 gross tons and 101,094 tons lost (Wagner 2010:149). Though Wagner does not expand on the definition of merchant vessel, one may imagine it to be like the merchant steamers described above. Once again this shows the nature of U-boat warfare and how little the primary objective varied between the wars, the main targets remained merchant shipping and the transportation of valuable resources.

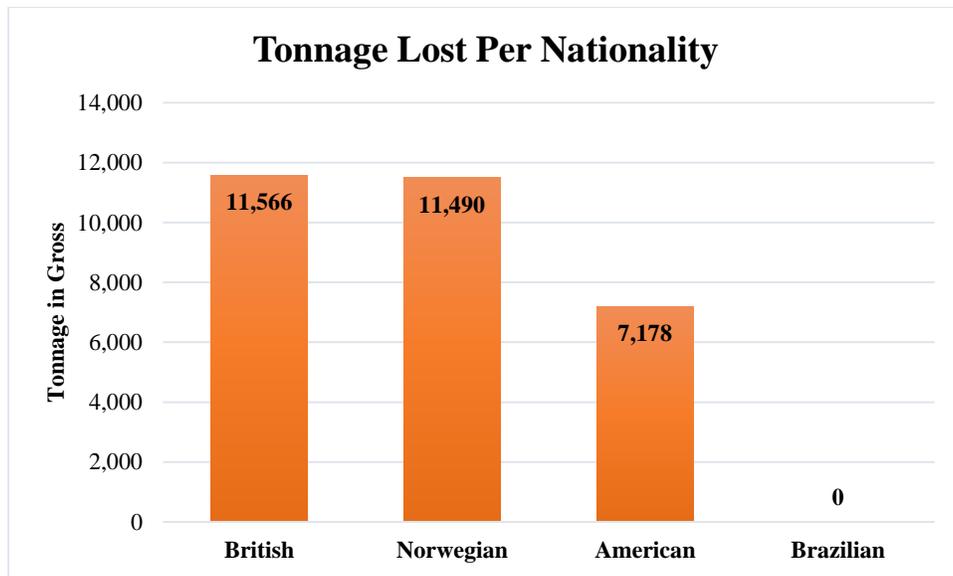


FIGURE 5.13. Chart of tonnage lost between each country (Chart by author).

For the First World War a total of 30,234 gross tons were lost to U-boat activities. Wagner in total had 304,189 gross tons of merchant shipping recorded as the loss in North Carolina along

(Wagner 2010:144). It is interesting to note that with Wagner's data, the United States suffered the heaviest loss in tonnage compared to any other nation (Wagner 2010:144). American vessels were the third highest tonnage lost during the First World War. This is due to the ship types sunk which were much smaller than Norwegian or British ships. The United States had a variety of merchant vessels from Coast Guard ships to steamers, all lower in tonnage than big oil tankers.

The breakdown of tonnage sunk per German vessel is illustrated below (Figure 5.14).

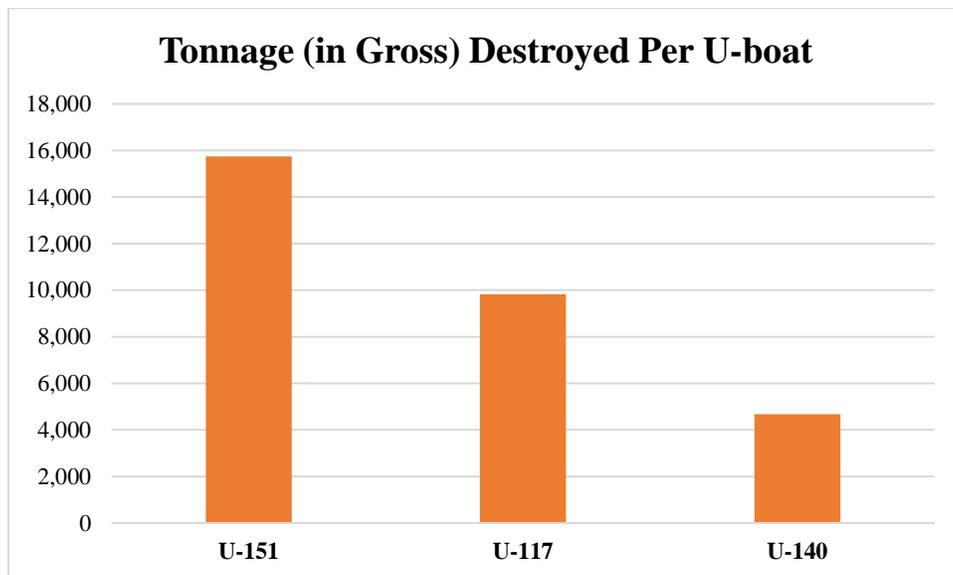


FIGURE 5.14. Chart of tonnage destroyed by each U-boat off North Carolina (Chart by author).

U-151 destroyed a majority of the tonnage, with five ships sunk (*Harpathian*, *Vinland*, *Pinar del Rio*, *Vindeggen*, and *Henrik Lund*), which accounts for half of the dataset represented. As previously stated, U-151 destroyed 15,736 gross tons, U-140 destroyed 4,674 gross tons, U-117 destroyed a total of 9,824 gross tons. The potential reason for U-151 having such a high tonnage rate is because the submarine sank the most ships. This may relate to U-151 being the first ship of its kind within the region and the American public, as well as, the merchant shipping lanes had not been warned of the dangers looming in their waters. Another potential explanation for

this is all the ships sunk by U-151 were steamers, as shown in the previous figure (Figure 6.3), which had the higher number of tonnage per represented vessel in total. Collectively all the submarines were successful in being part of the economic devastation of the region.

In total there were 21 U-boats involved in the Battle of the Atlantic within North Carolina waters (Wagner 2010:157). Because of the wide number of submarines within the region, most of the attack and success numbers for the U-boats in Wagner's dataset are relatively low. The most successful was Captain Johann Mohr of U-124, who managed to attack 8 ships and sink 6 (Wagner 2010:157). Compared to Captain von Nostitz of U-151 with a total of 6 ships attacked or encountered and 5 ships sunk, the numbers are not so different. The relative destruction of enemy ships fits within pattern exemplified by Wagner. The difference lies in technology (the ability to travel or hide for longer periods was greater in the Second World War), allocation of vessels (Germany had more U-boats dedicated to the Battle of the Atlantic than at the end of World War One), and time (World War Two lasted longer off North Carolina than the First World War). With a greater understanding of the parties involved in the conflict, the next step is to observe the direct action and frequency of events haven taken place.

### **Actions and Frequency**

Part of this thesis involves analyzing the overall trends and interactions between combatants and non-combatants in the war. With fifteen Allied/Neutral vessels and three Central Power vessels, the small group of relations between are easily measured with the use of a basic table, as shown below (Table 5.2). From the organized chart, one can extrapolate further details from the different categories of attack. Organized in a visual element below is the main interactions during the war (Figure 5.15).

Table 5.2. Actions and frequency of events during 1918. (Sources: Daniel 1920; Clark 1929; Gentile 1992).

Action Type	Frequency of Action
Known sinking location of vessel	10
Vessels attacked (shellfire)	2
Vessels attacked (torpedoed)	1
Vessels attacked (bombed)	6
Vessels struck mine/mines	1
Vessels attacked by U-boat but missed	3
Vessels stopped by U-boat but allowed to leave	1
Vessels run aground	1
U-boats depth charged by Allied vessel	1

### All Interactions During 1918 off North Carolina

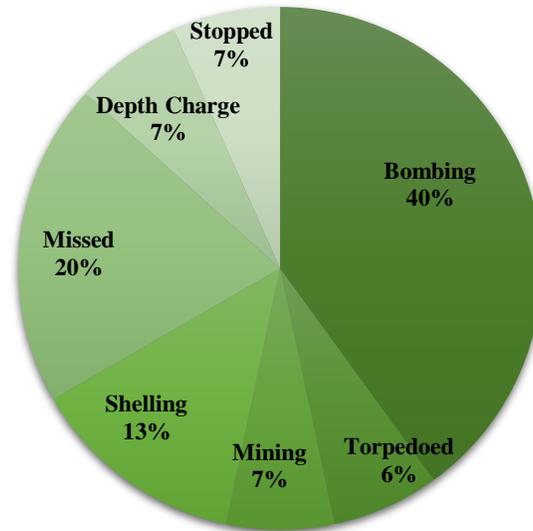


FIGURE 5.15 Chart of all interactions via event during 1918 off North Carolina (Chart by author).

Interactions were measured in: placement of bombs or explosives on the deck of a vessel (bombing), firing on the surface but missing the vessel attacked (missed), firing from the surface (shelling), firing a torpedo at another vessel (torpedoed), striking a sea mine (mining), attacking submerged vessel with depth charge (depth charge), and stopped but allowed to continue (stopped). *Vinland*, *Vindeggen*, *Henrik Lund*, *Stanley M. Seaman*, *Merak*, and *Nordhav* were all bombed on the surface by all three submarines as a standard practice used after overtaking a ship, evacuating the crew, taking the valuables on board, and then destroying the ship from a safe distance. This could also be availability of explosives on a submarine, as torpedoes were expensive, limited, and had an inventory to maintain (as shown in previous chapters).

U-140 unsuccessfully attacked four ships (*Bencleuch*, *Uberaba*, U.S.S *Stringham*, and U.S.S *Pastores*). The two ships shelled were *Pinar del Rio* by U-151 and *Diamond Shoals Lightship* by U-140. The rest were individual cases *Harpathian* was torpedoed, *Nicholson* was stopped and released, U.S.S *Stringham* depth charged U-140 several times, and though it is contended in the historic record, *Mirlo* most likely struck a mine or two before exploding.

Like any battle, there are a multitude of factors and weapons used to wage violence against one another. U-151, U-140, and U-117 used different techniques to destroy their enemy. The Allied forces did react towards one U-boat by depth charging and injuring the diving capabilities of the ship, ultimately playing in to the end of Waldmar Kophamel's career. Though U-boats generally avoided attacking armed enemy military craft, U-140 went out of its way to attack a Coast Guard vessel, a destroyer, and an armed merchant marine ship. Perhaps it speaks to the confidence of the captain after sinking three prior ships encountered off North Carolina, it is a unique anecdote in the history of the conflict and leaves open interpretation to the nature of the late 1918 naval warfare.

Wagner had similar types of activity occur within his dataset: shellfire, torpedoing, and minelaying (Wagner 2010:140). One of the interesting differences between the two wars is the change in naval tactics and use of technology. Nowhere does Wagner state that there were any instances of bombing involved, as this was an older tactic associated with the First World War and the act of halting a ship's actions before engaging in overtaking the vessel. U-boats of the Second World War acted from afar and used weapons like torpedoes in quick succession (Wagner 2010:140). Another interesting comparison is the rate of U-boats being attacked during the conflict. U-140 was the only U-boat attacked via depth charge, meanwhile Wagner lists four total submarines attacked and lists the types as "aerial bombs and ramming, aerial depth charge, and gunfire, shellfire and depth charges" (Wagner 2010:140). The use of aviation within naval warfare was only being explored at the end of World War One and as previously mentioned U-117 and U-140 were sunk due to government experiments with aerial bombing. The use of aircraft was common during the Second World War. The higher rate of attack and even loss of U-boats off North Carolina's coastline shows the broader scale of the Battle of the Atlantic. Perhaps if U-151 and U-117 stayed within the region for longer than three to five days than they would have been attacked and/or located by patrolling military craft.

The final chart in this set describes the basic time frame of which actions within North Carolina occurred (Figure 5.16). The summer of 1918 was marked as a chaotic time. Starting in early June with a brief wane in activity followed by a burst of two U-boats within the region. The overall timeline for U-151 is June 5, 1918 to June 10, 1918, U-140 August 5, 1918 to August 13, 1918, and U-117 August 15, 1918 to August 17, 1918. None of the ships operated within the same geographic location as the other, however, later U-117 would escort U-140 back to Kiel,

Germany. The U-boats were ordered individually to make the long journey to the United States coastline.

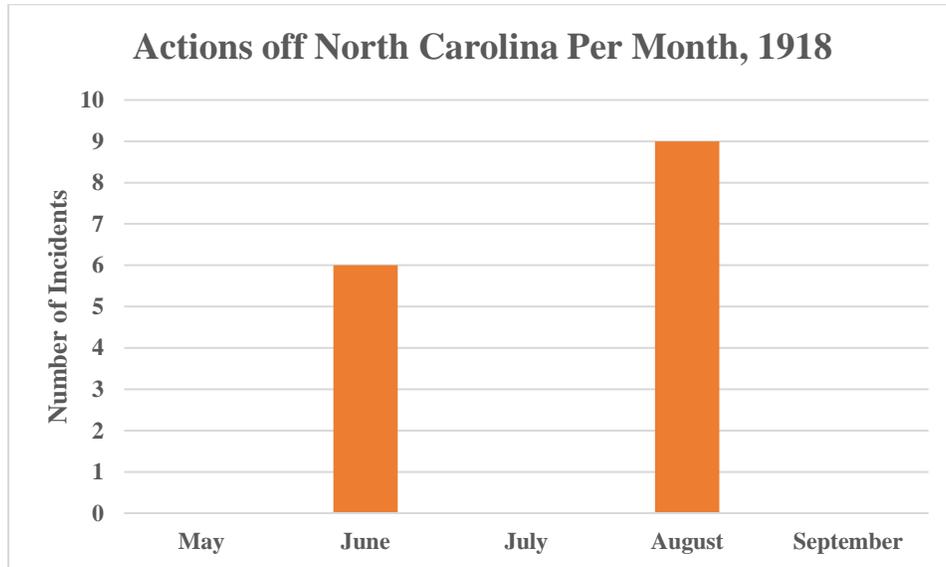


FIGURE 5.16. Chart of actions off North Carolina per month during 1918 (Chart by author).

The Battle of the Atlantic lasted much longer than the events during the First World War. Between 1942 and 1945, U-boats attacked ships off North Carolina, with the highest number of attacks (17-18) being in March and April of 1942 (Wagner 2010:145). The reason for the difference between the two wars comes down to two factors: America's entry into the war and the prioritization of naval craft. The United States entered the First World War relatively late in comparison to the Second World War and would only participate in nearly two years of fighting. Unlike Hitler later, the Kaiser did not deem the United States as a real threat. As previously described in Chapter Four, the Kaiser's regime used U-boats to continue the blockade of the British Isles over pursuing interest in the American coastline. The orders given to U-151, U-140, and U-117 were short lived and distractions from the main efforts in Europe. Because of the late entry into the war and the lack of threat to the German Navy, the U-boat attack on America in 1918 only lasted a few months. Even though the battle events, nationalities, tonnages, time line

of events, and other characteristics of the vessels within this short period of conflict can undoubtedly be studied and analyzed in numerous other ways, this general summation of information and events exemplifies the background of the battlefield and contributes to the overall geospatial analysis.

### **Conclusion**

In summation, by looking at the movement and activities of U-boats, a plethora of information was gained. Clearly, there was a focus on the upper to central coastal regions observed from the maps. The submarine U-151 was the most successful U-boat, having the largest tonnage sunk and wealth gained during their capture of *Vindeggen*, as well as, falling second in the highest casualty rate off North Carolina during the war. U-117 fell in close second with the second highest tonnage sunk but had the highest casualty rate with the explosion of *Mirlo*. U-140 was successful in its own way by attacking Diamond Shoals Lightship set a new precedent on the attack of military and undefended aid vessels off the coastline and sent a message to the public on the brutality and retaliation associated with war.

Overall, the records of minelaying activities produced by both the man who was responsible for their placement and the organization in charge of their removal offer an interesting side interpretation of non-direct U-boat operations during the war. Otto Drösher described and illustrated a large range of mines going from Corolla to Buxton, North Carolina while the United States Navy simplified their version to strictly areas outside of Rodanthe, North Carolina as they were most likely found within the mine removal process. By combining all maps, the result is a multifaceted interpretation of directionality and placement of the battlefield and adds different actors into the larger understanding of how the area operated during and after

the war. The statistics add depth to the interpretation of the conflict and contribute towards answering the secondary questions posed. By comparing the First World War to the data collected for the Battle of the Atlantic, insightful reflections of the differing period and studies are gained. Though this adds to the overall rendering of the battlefield, there are still key missing elements needing to be explored to completely understand the conflict.

## **CHAPTER SIX: ANALYSIS AND VISUALIZATION OF THE BATTLESCAPE**

### **Introduction**

This thesis follows along with the methodology employed by Wagner to produce his 2010 map of the Battle of the Atlantic. This involves following the processes laid out within his work as closely as possible to determine if the production of a battlescape for World War One is not only feasible, but what it tells the reader about the geospatial variants that define the generated projection. Wagner began his analysis of NC's Second World War battlescape by conducting several smaller projections: a centrality map, a density map, convex hulls of each individual battle or U-boat, attacks in relation to shipping lanes, monthly to yearly activities, and individual assaults by U-boats. He reasoned that, "By mapping smaller battlefield elements such as centers of activity, densities of activity, and extents of activity over time, analyses can be conducted that reveal hotspots of activity while at the same time revealing the extent of sea the battle transpired on" (Wagner 2010:160). The overall purpose of this process is to delineate the boundaries of the battlefield.

There are several limitations to the application of this methodology to this dataset; the first is the difference in density projections. Wagner used a map from the Second World War with information from the layout grid system established by the Kriegsmarine during the Battle of the Atlantic. He used a density of events occurring within any 36 square nautical mile area to project the distribution of events (Wagner 2010:164). There is no such layout for the German submariners in 1918, nor unit of measure to define the area occupied by the Central Power's campaign. Instead the method outlined to create a similar map is outlined below in the section on centrality and density. The second limitation is the lack of maps on the shipping lanes during this period. Whether there is an absence of existing records, restricted access to records, or the

inability for the researcher to find pertinent information on the subject, there is no shipping lane map to conduct any comparison with. The information may be inferred by looking at the locality of the U-boats along the coastline. The final limitation is the overall timeframe which the activities took place lasted between a two-month period in a singular year, monthly and yearly recording of skirmishes do not exist within the geographic boundaries outlined in this thesis. Instead individual submarine activities are projected along the coastline and previously displayed in chapter 5.

This section begins with an introductory description of the conditions that encompass a battlefield, and follows Wagner's methodology (centrality, density, and convex hulls). Upon completion, further analysis of the factors contributing to the shaping and delegation of the area considered part of the conflict, and finally draws the information gained from the display for further analysis in the final chapter.

### **Analysis of the Battlefield**

The events occurring within North Carolina waters during the summer of 1918 fit into the general description of a battle previously defined as, groups of people exacting regulated violence on one another (Schofield et al. 2002:9). Two or more groups, the German submarines against the general unarmed merchant population, as well as, two military craft enacted violence in the form of shelling, bombing, torpedoing, depth charging, and mine laying across the state's waters. One way to classify wartime activities and drawn boundaries from the geographical data is to adhere to definitions given by the National Parks Service. In their 2016 report for the American Battlefield Protection Programs' (ABPP) *Battlefield Survey Manual 2016*, they defined a Battlefield Boundary as, "...encompasses the ground over which units maneuvered in

preparation for combat” (National Park Service 2016:2). This covers the areas of movement, as well as, areas of attack. Another important designation pertinent to this study is the Core Area which, “defines the area where the most significant combat occurred” (National Park Service 2016:2). These guiding principles will aid in the completion of the battlescape as the nature of warfare during this period was complex. There was no formal line up, no official planning in the sense of a battle between two enemies in a secured position. Many of the events as previously mentioned display strict adherence to the traditional system of overtaking a vessel during the war. There was no grand battle, no singular event with a clearly defined location of action by higher military powers.

What instead occurred was a type of warfare different compared from the war to follow it. Between these U-boats and the unfortunate merchants and military craft, the nature of these events is best described as spontaneous, with quick-fire moments. They were opportunistic at best, with limited planning needed. Because of the vague orders given by the German regime, it could be inferred that von Nostitz, Kophamel, and Dröscher acted upon their own individual agency and followed their own personal judgement on whether a passing ship was worthy of using a finite set of munitions and supplies on them. Another limitation to a full siege of the American and Canadian coastline was the allotment and time frame in which these three, or seven vessels were given to operate under. By the time Germany gained a vested interest in America, the war was ending on the Western Front. Despite being at war since 1917, a full year came and passed before orders were given to attack the United States directly within their own waters. With time, limitations in access to supplies, and singular vessels dictated at different times, as U-151 arrived in May of 1918 where as it took two more for U-140 and U-117 to

follow. These restraints affected the nature of warfare conducted and lead to an interesting variant when compared to the battles of the Second World War.

### **Centrality and Density of the Battlefield**

One way to evaluate the extent of an area of conflict over time is recording the center points of battlefield activity. Wagner used this tool to evaluate the changes in tactics and interactions over months of the Second World War. These “hot spots” of activity indicate focal points over the short course of conflict. For this study the center points were measured for an overall range of interactions, the delineated range of interactions, and for each individual U-boat. The scope of activity off the North American coastline swept from Newfoundland and extended into Cape Lookout, North Carolina. For later speculated reasons, the state’s waters were the stopping place in a quick and chaotic period. There are two areas of activity measured by the higher peaks of action within the regions; these are Wimble and Diamond Shoals. The attraction to these shoals and active avoidance of these dangerous waterways are indicative of the submariners understanding the local waterways.

Overall there are less than twenty recorded activities off North Carolina, as previously depicted. With the smaller dataset, the centrality can be easily measured overall. Wagner had a primary source which measured the center point of the Battle of the Atlantic, however, no such measurement pre-exists for the First World War. Instead the mean center tool in ArcGIS was incorporated to generate a projected central location of all coordinate data in the study. This hot spot produced from the data lies approximately 84.3 Miles off the shore line of what is now known as Pea Island National Wildlife Sanctuary, NC (Figure 6.1). The exact geographic coordinates are displayed below (Table 6.1).

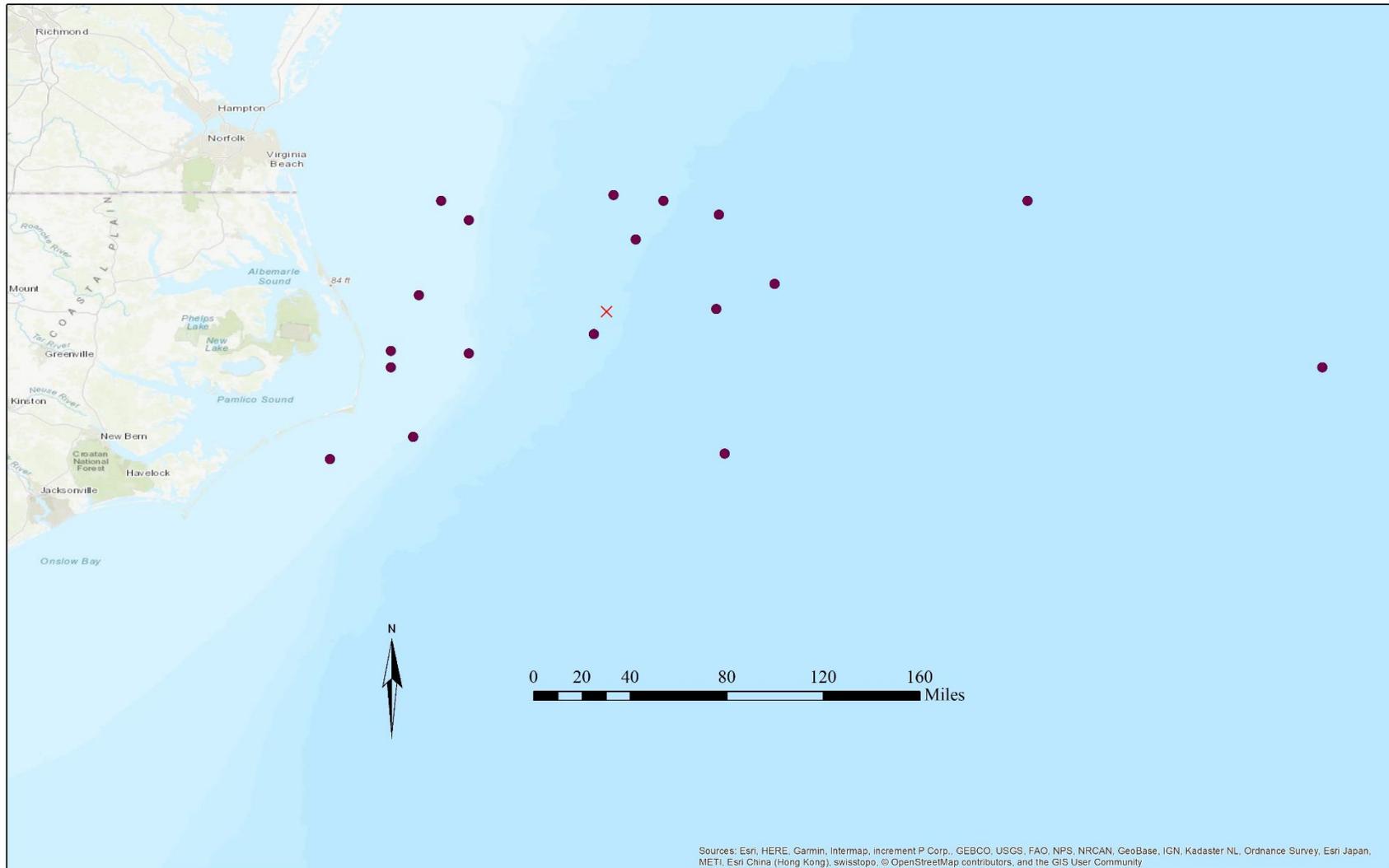


FIGURE 6.1. Center point of all U-boat activity during World War One, each point representing a vessel or mine (Map by author).

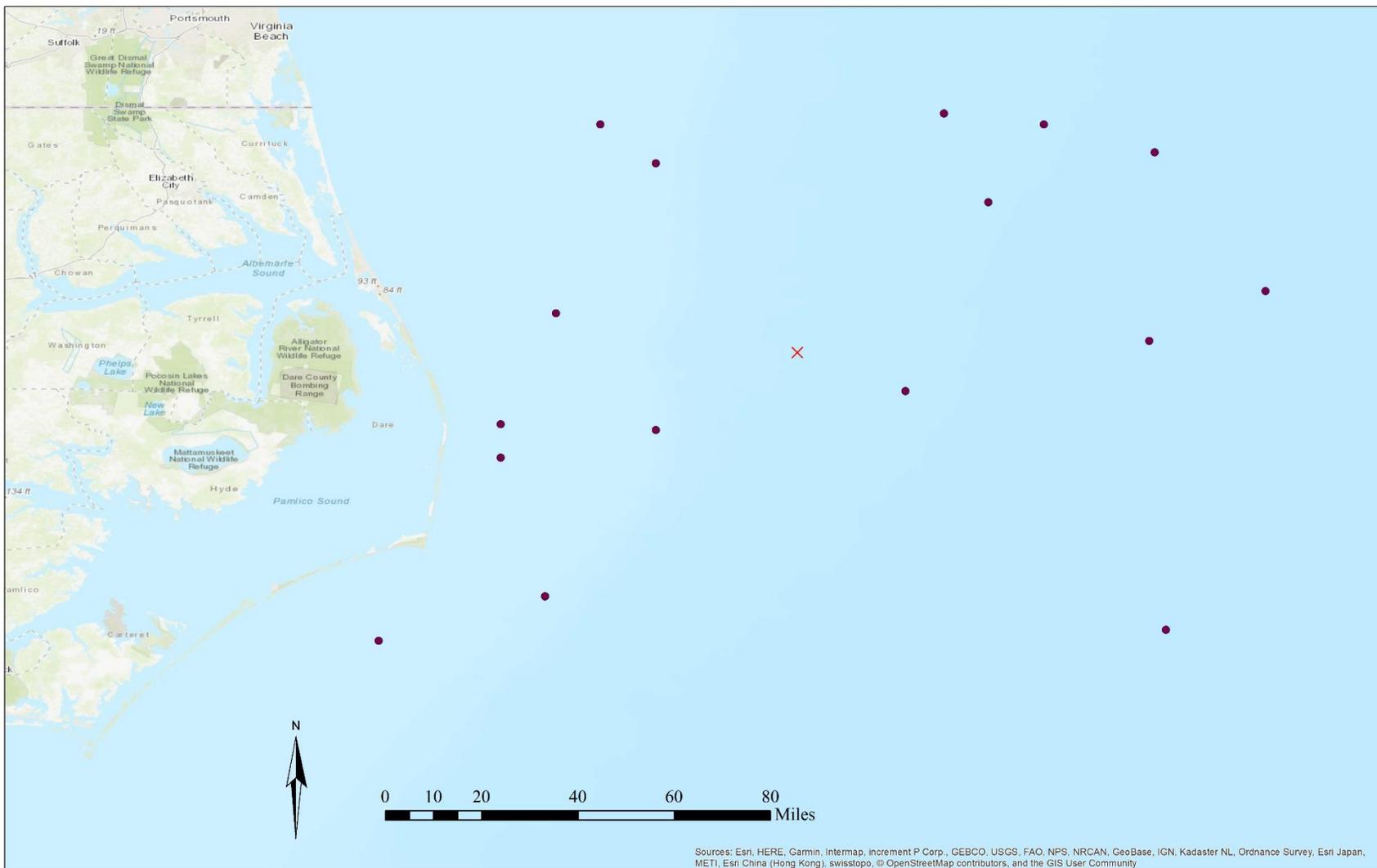


FIGURE 6.2: Center point of the battlefield without outliers (Map by author).

Table 6.1: Coordinates for the center of all battle activity.

	<b>Decimal Degrees</b>	<b>Lat, Long</b>
<b>Center of All Battlefield Activity</b>	35.835068, -74.006984	35° 50' 6.2442" N., 74° 0' 25.1424" W.

The placement of the center point makes sense within the context of the distribution of events across the coastline. The location in the central cluster of points is within the range of one hundred miles from the nearest landforms. One of the primary issues when using the mean center tool is that all features within a data set are considered when plotting the geographic center. Any outliers within a collection will offset the plot point. Within this dataset two incidents are geographic isolates and are further from any other event. These include the sinking of *Henrik Lund* and the attack on USS *Pastores*. Both points were recorded over two hundred miles off the coast and are both one hundred miles from the last ship sunk or attacked (*Vindeggen* and USS *Stringham*) in the procession of events. By removing the outliers from the distribution of data, the centrality of the battlefield shows a significant shift in location (Figure 6.2). The exact location of the new point is shown below in Table 6.2 and is approximately twenty-three miles west of the original image.

Table 6: Center point without outliers

	<b>Decimal Degrees</b>	<b>Lat, Long</b>
<b>Center of Main Battlefield Activity</b>	35.815665, -74.407812	35° 48' 56.394" N., 74° 24' 28.1232" W.

There is an instant change to the placement of the geographic center of activity. The mark is closer to the coastline where the extent of the most dramatic interactions took place while also considering the secondary sweep of action away from the immediate coastline. This leads the researcher to believe that the actions carried out by the U-boat Captains during this period were

more likely to avoid the coastline, going only as far to take opportunistic attacks on passing ships or to place deadly mines in areas known for heavy merchant traffic.

While using the mean center tool is helpful in looking for key hot spots for the overall extent of the battlefield, with and without outliers, it is also applicable to individual U-boat attacks. All three submarines were given the same treatment as the collective data, with not so surprising results when examined besides the historic narrative. U-151 primarily stayed closer to the border of Virginia and kept away from the immediate coastline. One can see the cluster of attacks carried out over a five-day period in Figure 6.3. The exact center geographic point of action is shown within the Table 6.3 and highlights the dense cluster of attacks on shipping. The hot spot would shift significantly if the known outlier, *Henrik Lund* were to be removed but for displaying all the attacks per ship, it remained on this map.

Table 6.3: Center point for U-151.

	<b>Decimal Degrees</b>	<b>Lat, Long</b>
<b>Center of U-151's Activity</b>	36.45275, -73.547183	36° 27' 9.9" N., 73° 32' 49.8588" W.

As for U-140, the map is based on the largely varying spread of quick fire interactions between the submarine and combatant/non-combatant vessels. The U-boat followed a different path going towards the coastline and then retreating and heading hundreds of miles from any terrestrial boundary. U-140 is the only submarine within the dataset to attack multiple military craft over the course of the war in North Carolina's borders. The central geographic location is displayed in Figure 6.4 and shows the extent of the events associated with the submarine. The exact location is shown in Table 6.4, and relates to the issue surrounding U-151, the outlier of the attack on USS *Pastores* skews the placement of the location, though it is clustered towards the first and last interactions with combatants and non-combatants in the region.

Table 6.4: Center point for U-140.

	<b>Decimal Degrees</b>	<b>Lat, Long</b>
<b>Center of U-140's Activity</b>	35.349986, -73.623771	35° 20' 59.9496" N., 73° 37' 25.5756" W.

Finally, U-117 was tested in the same manner as the other ships within the dataset. This submarine has the least amount of activity; however, the most important feature is the minefield created by the vessel. Based on the captain's interpretation, the minefield existed outside of Wimble Shoals and runs the length of the coast. The center point, as shown in Figure 6.5 and recorded in the table below (Table 6.5).

Table 6.5: Center point for U-117.

	<b>Decimal Degrees</b>	<b>Lat, Long</b>
<b>Center of U-117's Activity</b>	35.783317, -74.913867	35° 46' 59.9406" N., 74° 54' 49.9206" W.

The point falls between the boundaries of the minefield and the dramatic sinking of *Mirlo*. This correlates with the historic record as most of the wartime activities perpetrated by the U-boat were closer to the coastline

While the use of centrality is important, it is important to also use a density map to explain why these areas of activity occur in the locations that they do (Wagner 2010:164). For this process the full dataset was put through the kernel density tool to measure the most concentrated areas of activity. By inputting all features, a raster image layer was produced displaying the distribution of data from highest to lowest grouping of events. The map generated from this spatial analysis tool is shown below in Figure 6.6.

Indicated by a change in color, the areas of interest are off Nags Head, NC and unsurprisingly, off Wimble Shoals. The highest number of events counted for the mine laying operations of U-117.

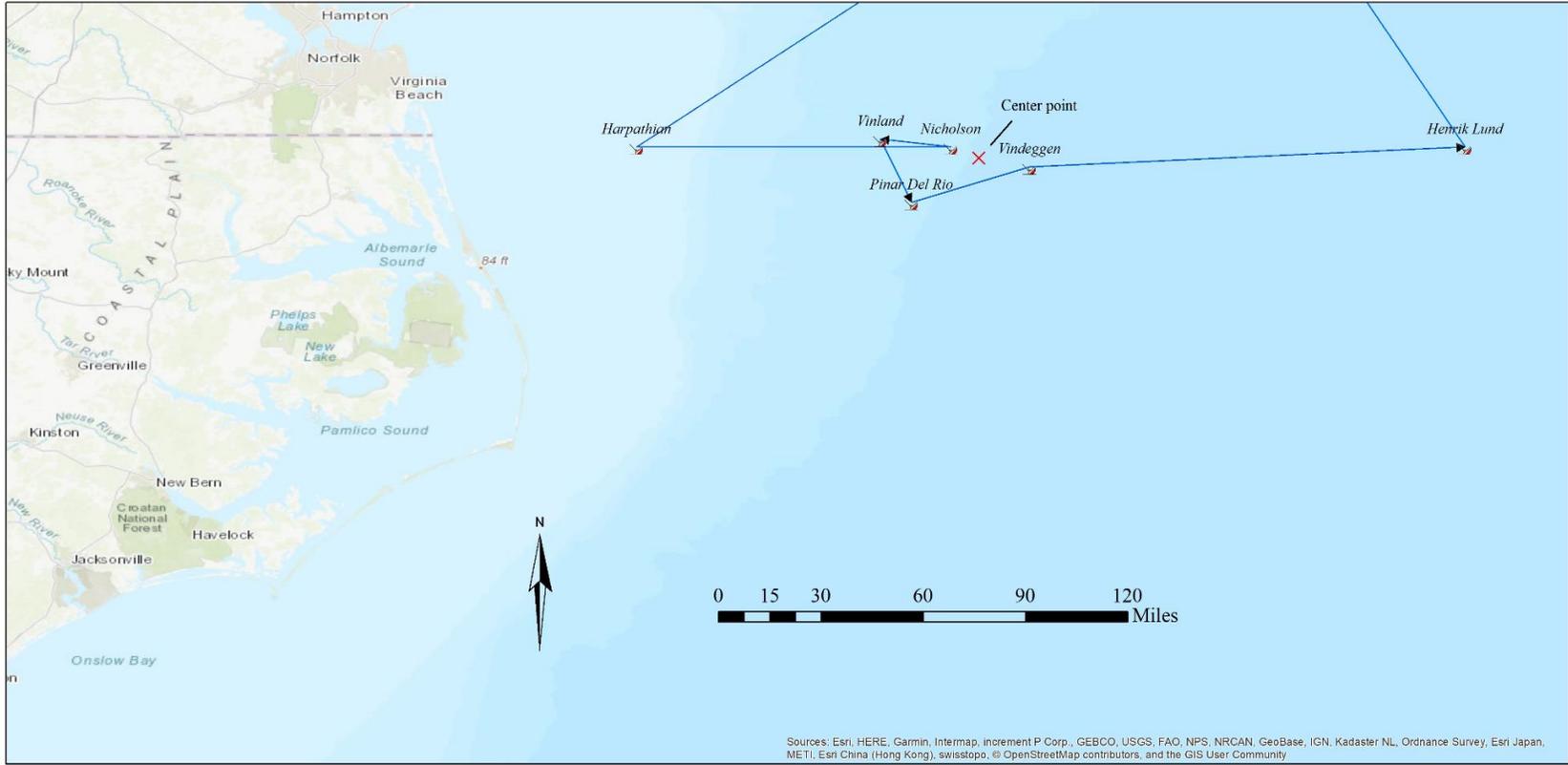
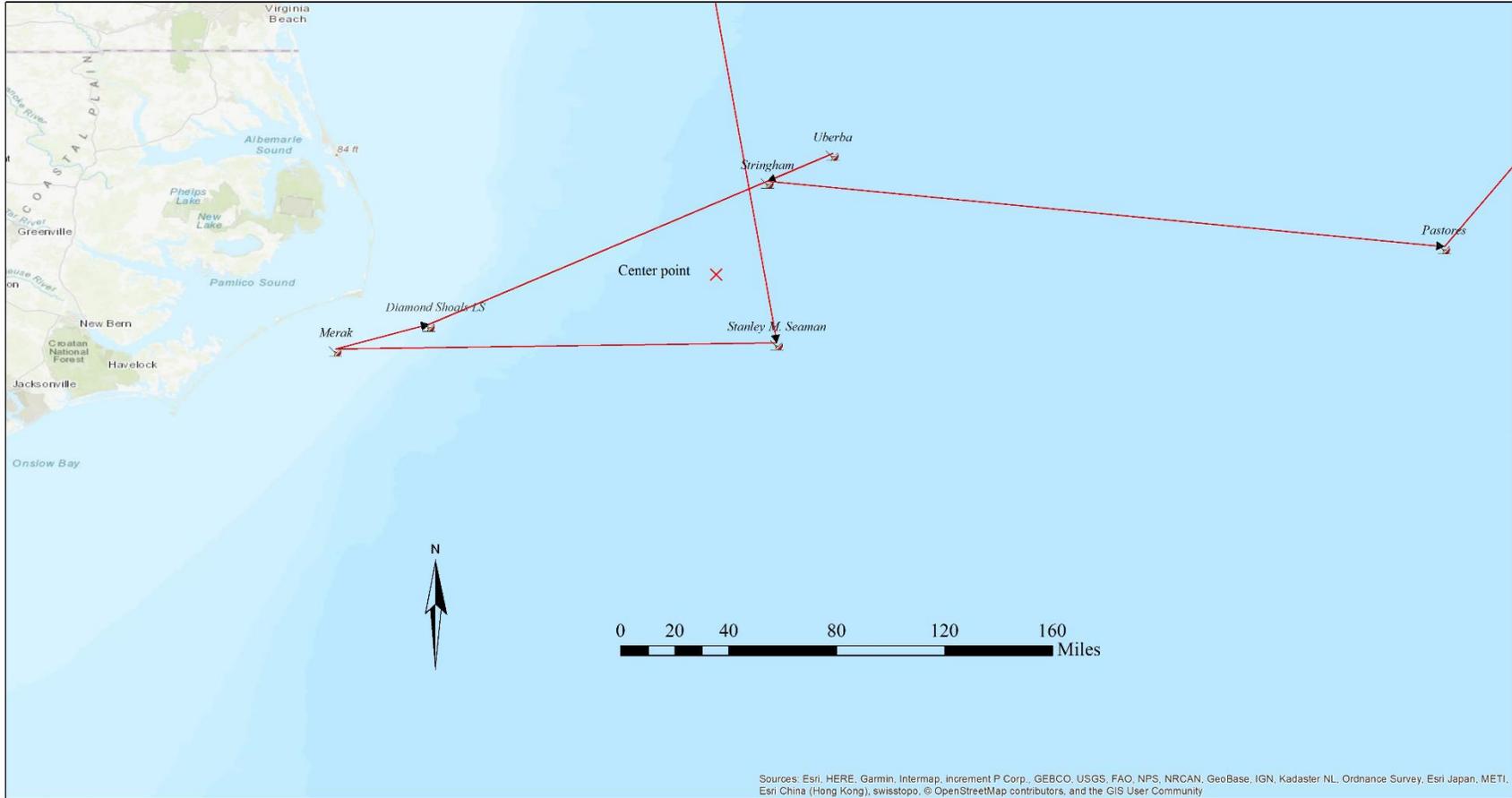


FIGURE 6.3. Center point of all activity for U-151 (Map by author).



\* The attack on Bencleuch and the sinking of Diamond Shoals Lightship were recorded at the same latitude and longitude by the US Navy

FIGURE 6.4. Center point for all activity for U-140 (Map by author).

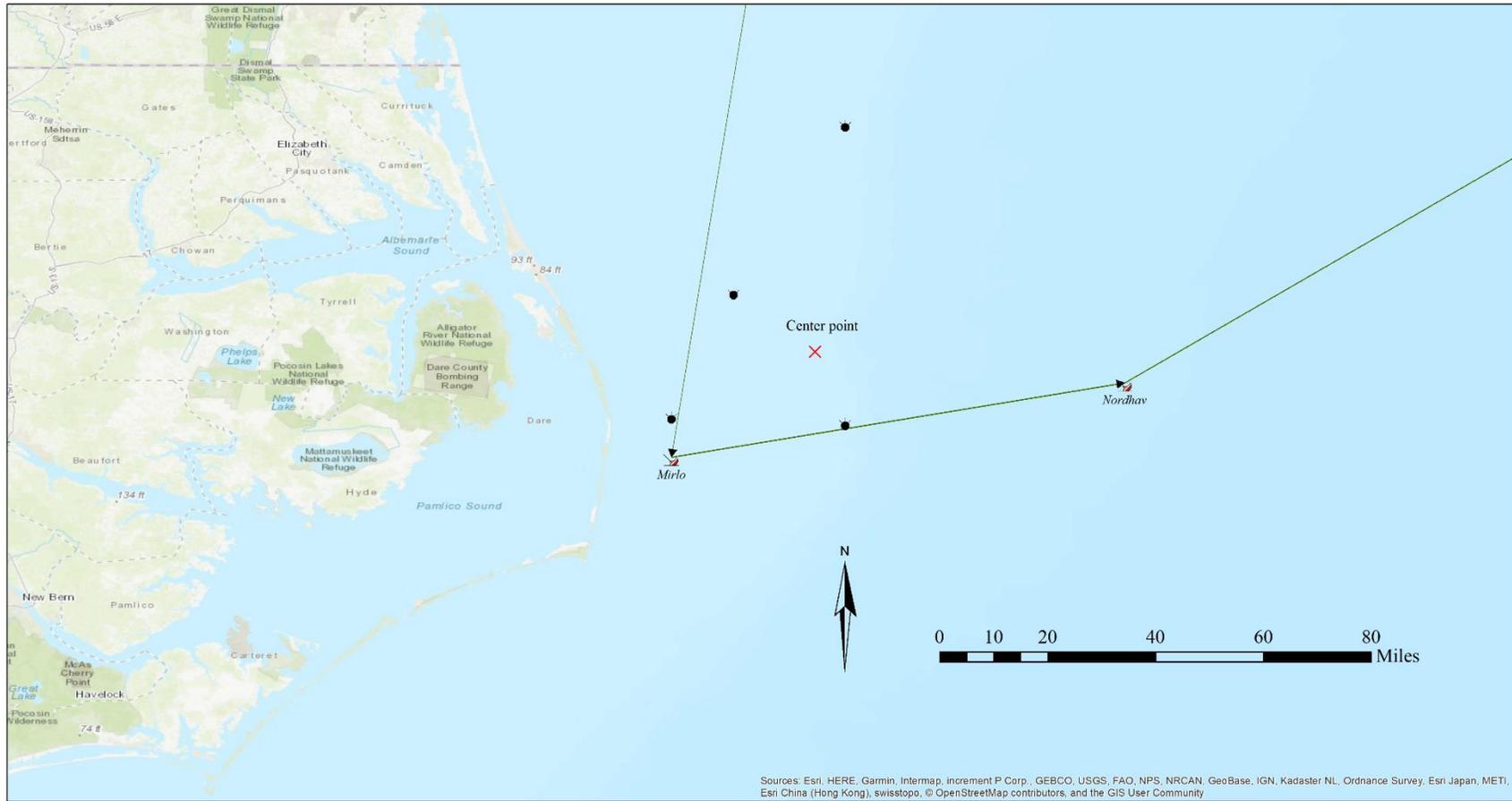


FIGURE 6.5. Center point of all activities for U-117, including Dröscher’s mine field.

With the known historic account of the incidents off North Carolina, the heavy distribution of activities on the direct coastline are not surprising nor unexpected. The attacks closer to land were the more destructed and short-lived events that often highlighted the career of the U-boat within the area. The lighter colored cluster of occurrences towards the center portion of the map, mark the secondary area of concentration of U-boats attacking ships within the seventy-five to one hundred mile range from the coastline. These actions follow the pattern previously described of the submarine finding ample opportunity off the coastline but needing for security and safety to back away from potential patrols and unwanted sightings. The rest of the events are shown as singular or bordering events to the region.

The information gleaned from the map above is important for understanding the dynamic nature of the battle and the places most impacted during the war. However helpful centrality and density may be in further delineating the battlefield they do not explain all aspects of the war. These maps depict the number of events and frequency of interactions between vessels but does not show the movement and extent of the battlefield over time. For that a different type of geospatial analysis needs to be applied.

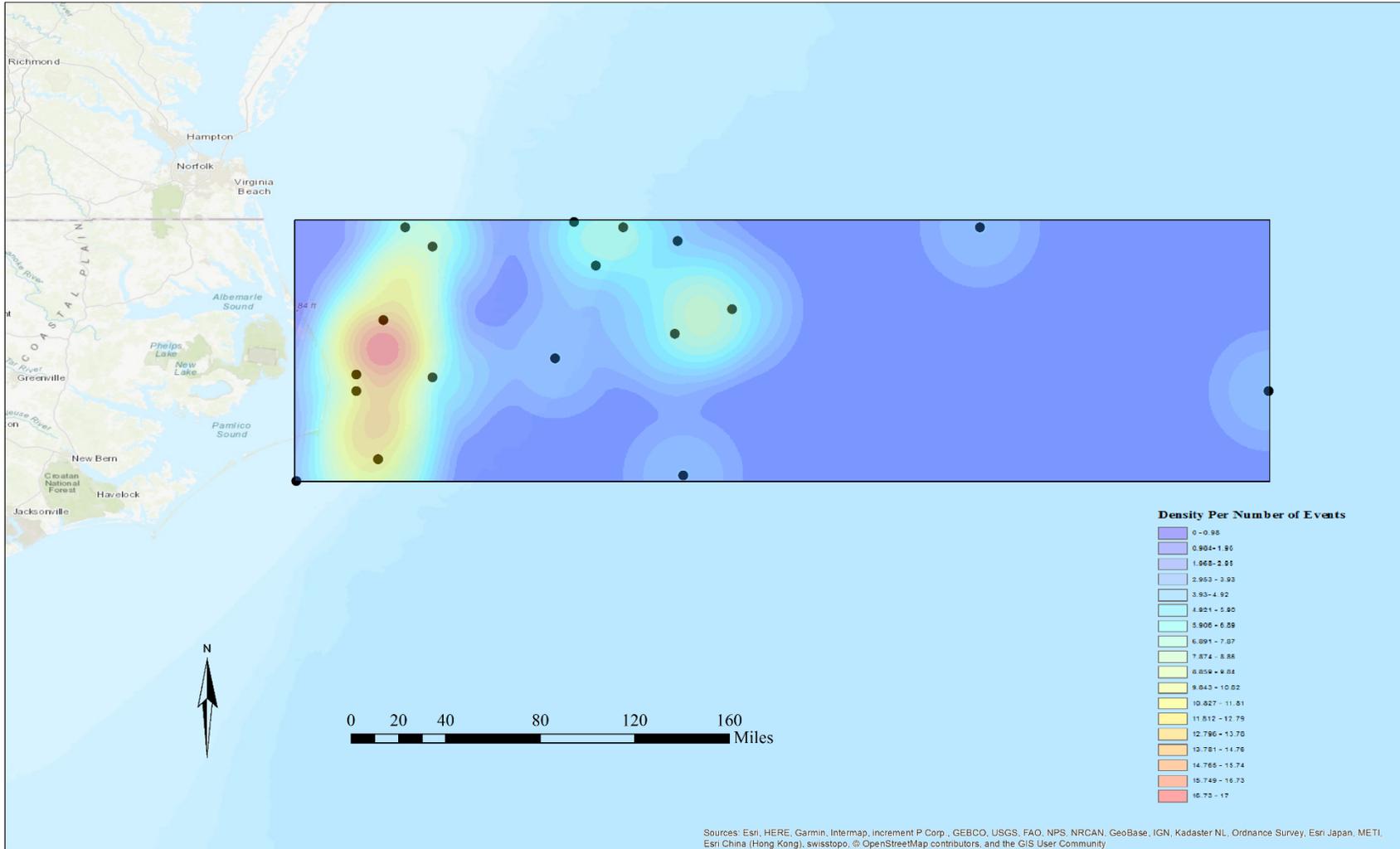


FIGURE 6.6. Kernel density map of all battlefield activities (Map by author).

## Convex Hulls

Previous maps from Chapter Five, depict the general movement and trends for each U-boat over the short burst of activity exhibited during June and August of 1918. The events of each month can be outlined and mapped using the Convex Hull tool to show the overall extent for every time span. This tool allows the user to project a polygon over selected shapefiles to create an enclosed boundary marker spanning the length of the data received. Wagner used the convex hull polygon to project monthly and yearly events, for this study, maps were generated of each individual submarine's activities and an overall comparison of the three U-boats.

Before analyzing the results of the generation, it should be stated that the use of the convex hull tool has the same issues as the mean center function; if there is any outlying data then it will be counted within production of the map. Wagner explained this phenomenon as, "since the convex hull envelops all the events occurring in North Carolina waters for a particular time span by drawing a polygon around the outermost events, the extent of the polygon is severely affected by extreme outlying events" (Wagner 2010:166). The outlying points affect the polygon's projection by over-representing the extent of the area of interest, however, this tool provides useful visual depictions of shapefiles. The over extent and issues surrounding Convex Hulls are exemplified in Figures 6.7 through 6.8.

The difference between the two is immediately apparent, particularly with U-140. U-151 traveled approximately 244 miles over the course of five days. The closest the submarine came to the shoreline was 47.6 Miles from Currituck County. The original distance traveled by the U-140 (over 558 miles) is halved when the outlier of USS *Pastores* is removed to show the true range of activity in the area.

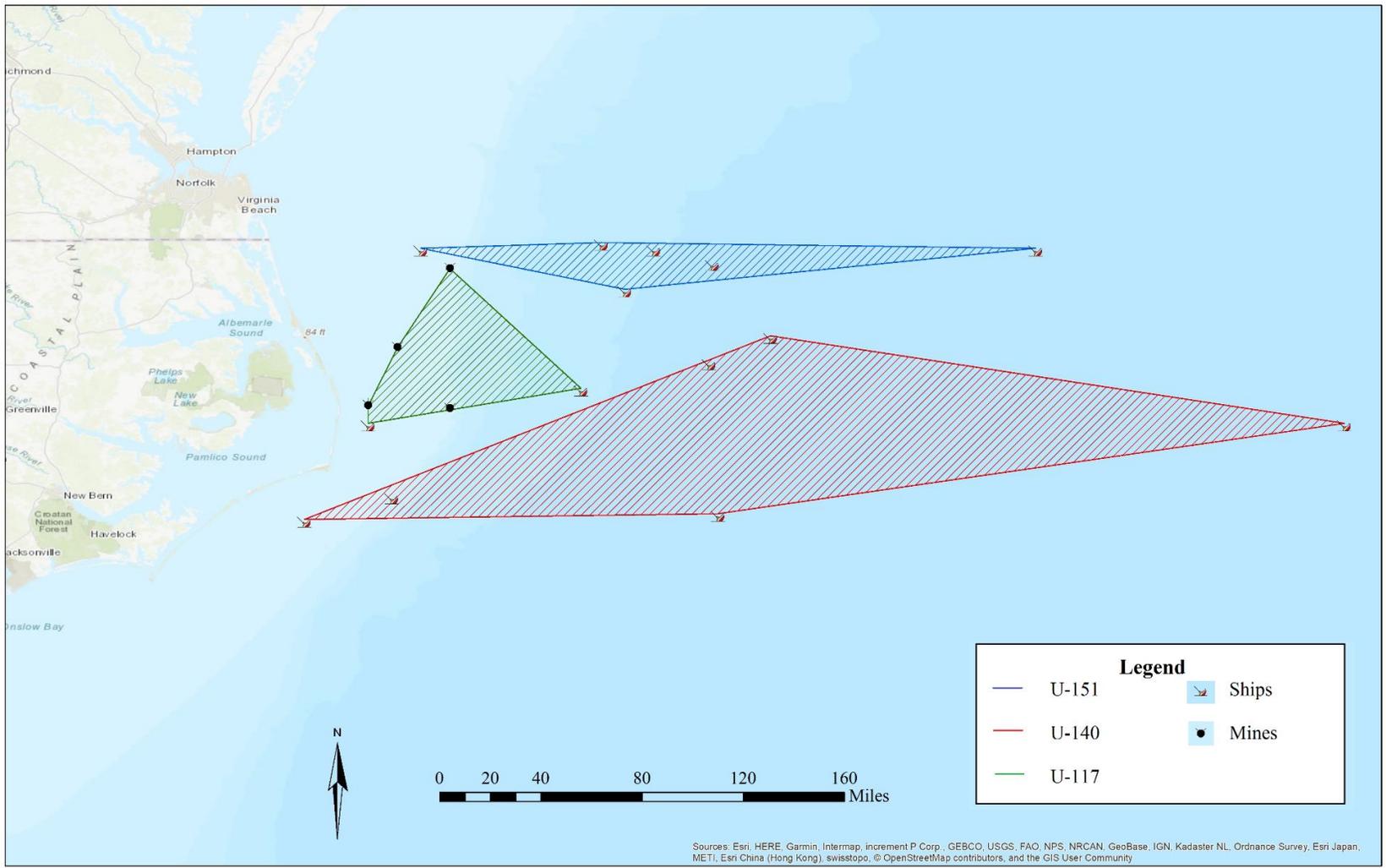


FIGURE 6.7. All convex hulls for the entire battlefield (Map by author).

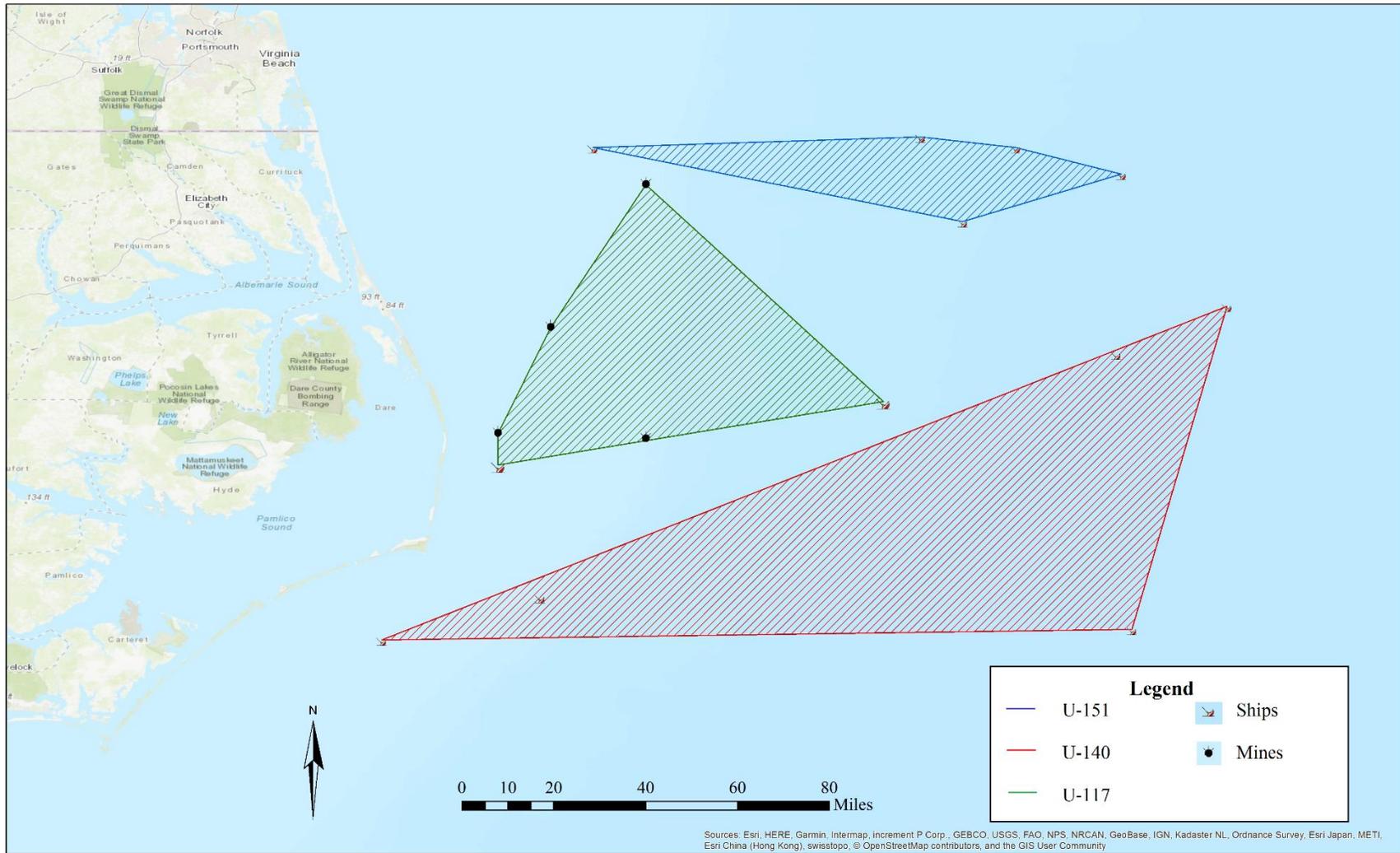


FIGURE 6.8. All convex hulls for the entire battlefield without outliers (Map by author).

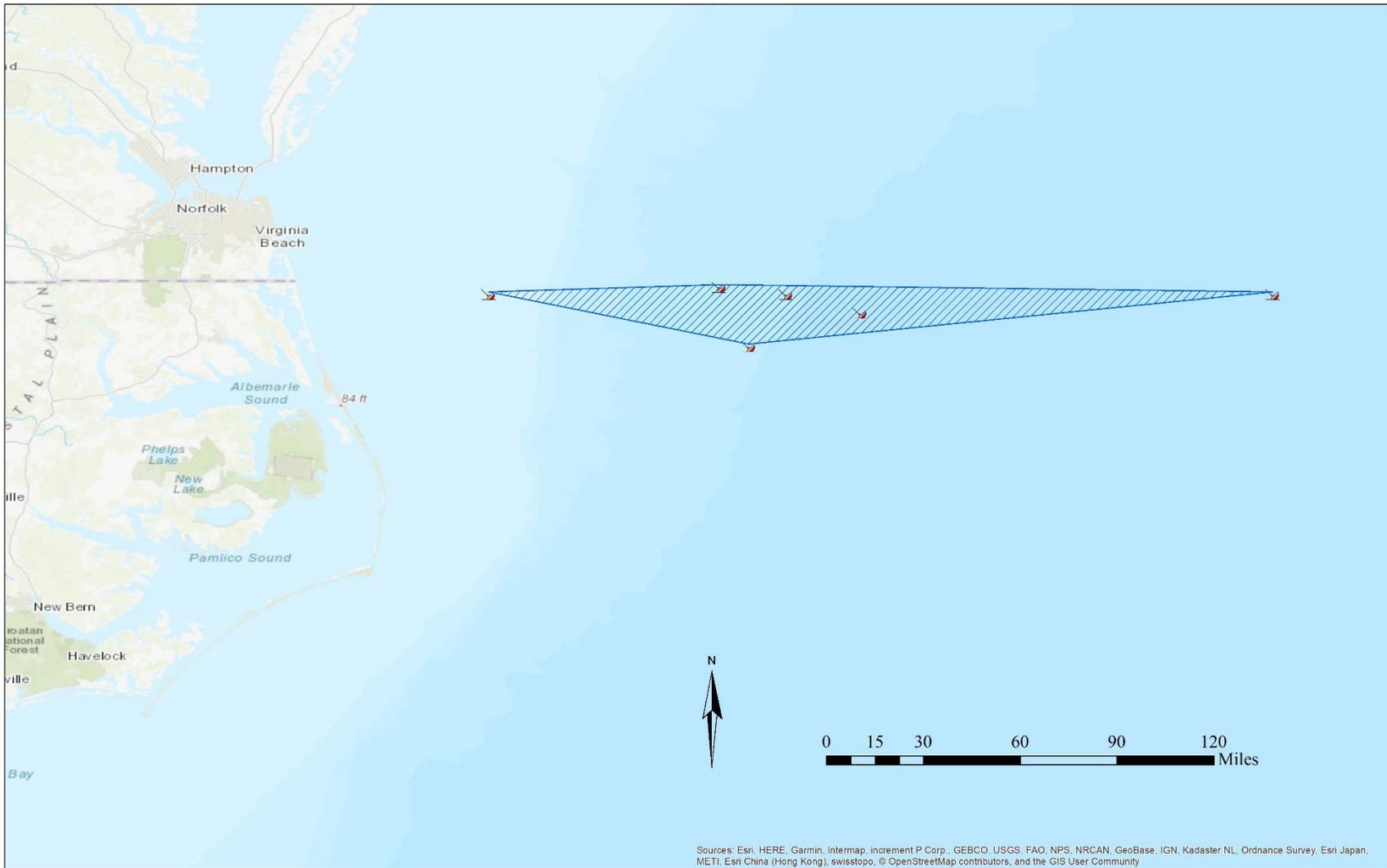


FIGURE 6.9. Convex hull for U-151, including outlier (Map by author).

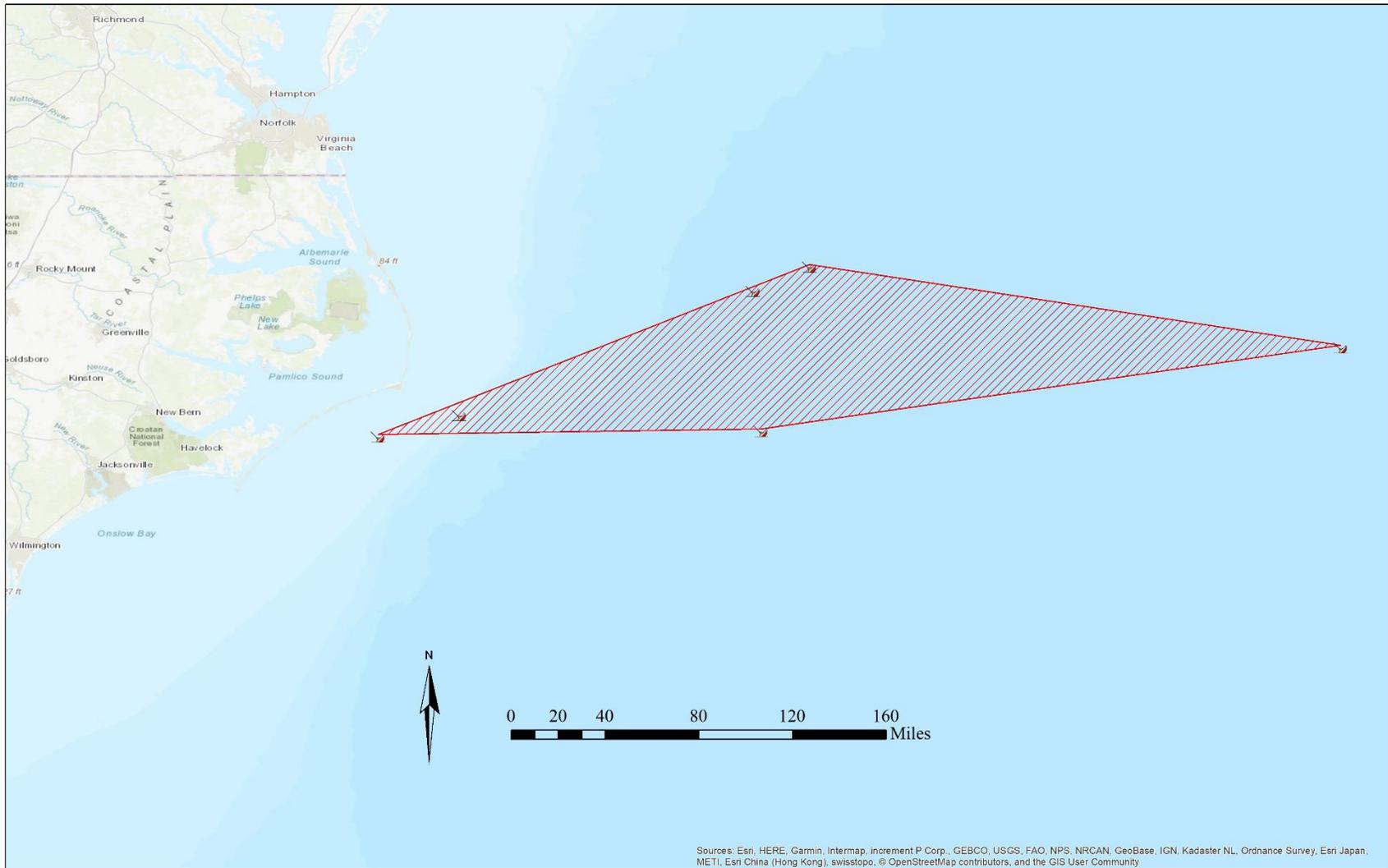


FIGURE 6.10. Convex hull for U-140, including outlier (Map by author).



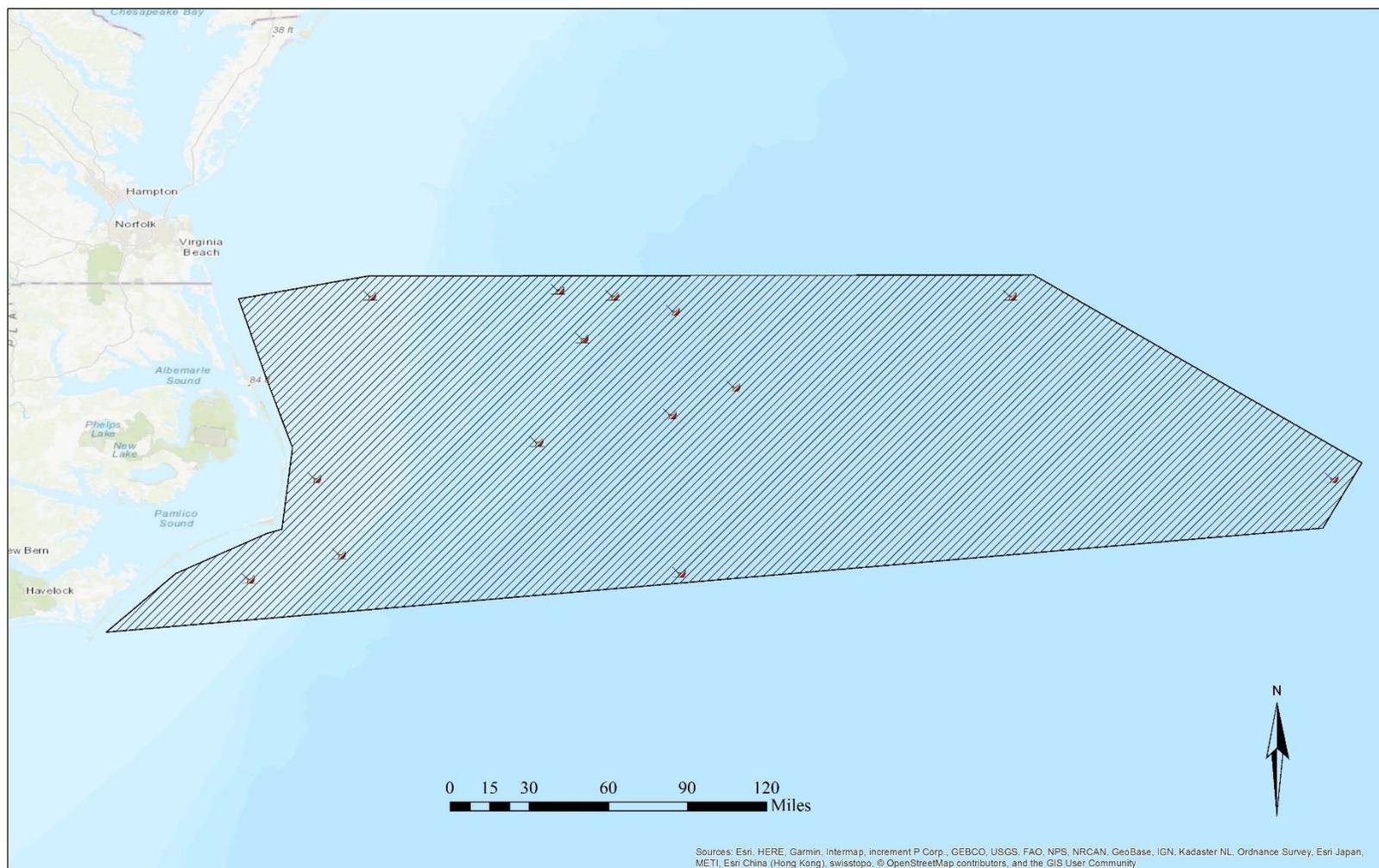
Despite this, U-140 (Figure 6.10) still occupies most of the region. The landfall the submarine ever came closest to was 30.4 miles from the northern shore line of Cape Lookout National Seashore. The longest distanced traveled over the course of a day by U-140 was 134.3 miles between the sinking of *Stanley M. Seaman* and *Merak*. U-117 occupies the second largest convex hull because of the minefield placed off the coastline. This submarine occupied the closest space to the direct coastline and had the shortest operation within the region (a total of three days). The submarine covered roughly 70 miles within North Carolina waters.

All three represent the trend followed by the entire Central Power's campaign in the Americas which was based on causing chaos and destruction as a last-ditch effort in a war that was ending in Europe. They are all short lived, small clusters of activity that end with the U-boat leaving the vicinity towards the safer route of the outer Atlantic. Overall, they occupied a large region of the ocean for such a moment; each submarine traveling hundreds of miles in the span of nine days or less. The use of convex hulls and mapping of individual activity help with better understanding the directionality and vicinity of the overall battlefield within a two-month period.

### **Conclusion**

Upon examining the extent of actions, vessels involved, nationalities of actors within the theater of war, and the geographic coordinates taken, make up the basis of the boundaries of the battlefield. Some of the definitive factor that helped shaped the directionality was the mine laying region compiled by Dröscher and the earliest of interactions starting with *Harpathian* at 36° 30'N., 75° 00'W. The entire battlescape encapsulates over 42908.2 square miles, including all interactions and sinking events. Because of the two far coordinates of events from the central location closer to coastline, there is a split in the battlefield boundaries having primary

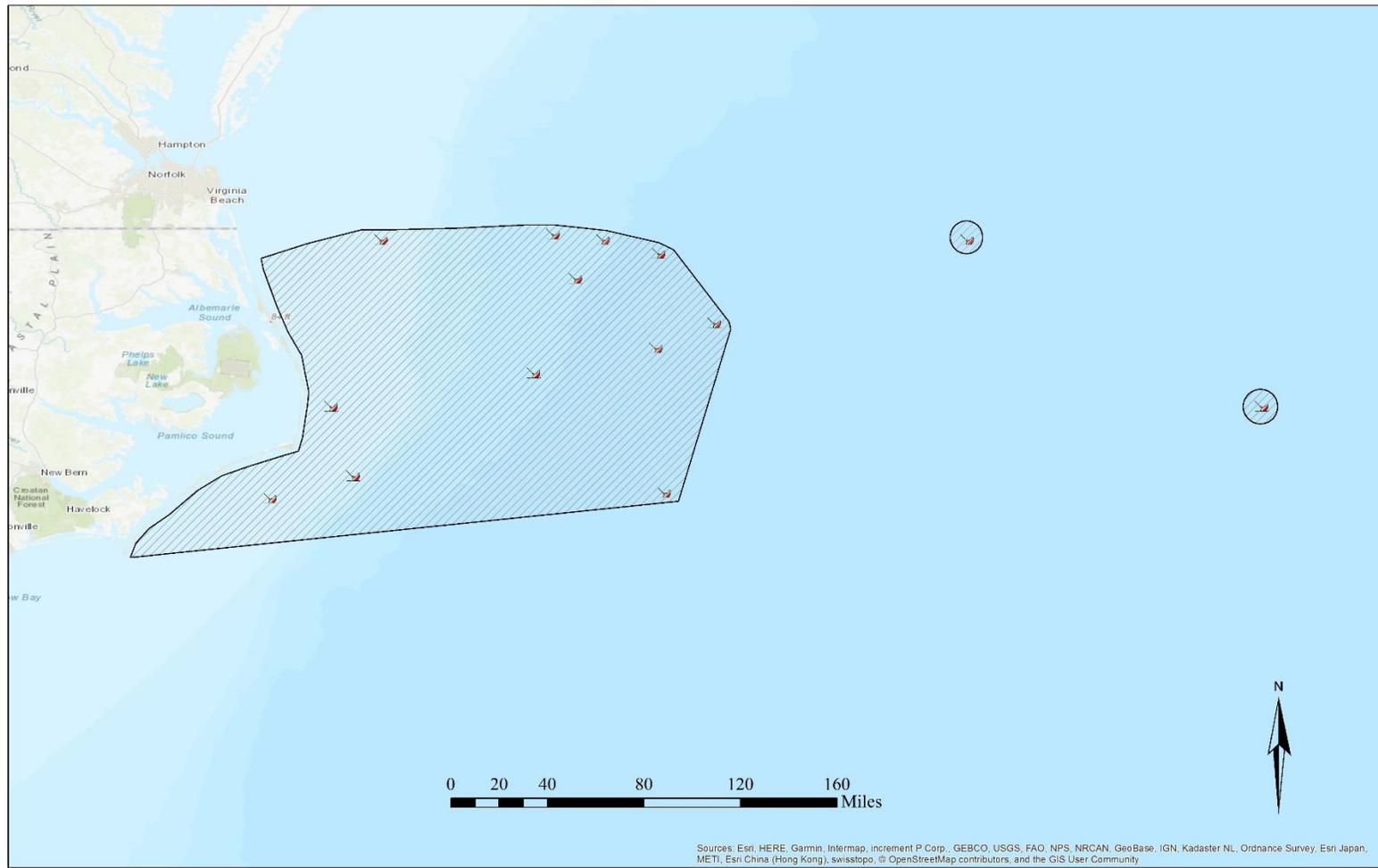
interactions and secondary interactions. A total of 22,062.8 square miles makeup the core area of the battlefield. The map compiled represents the engagements based upon events, geography, minefields, and coastal actions that in some way affected the course of the battle over a three-month period (represented below in Figures 6.12 through 6.14).



⊕ Symbol represents the boundaries of the Primary battlefield

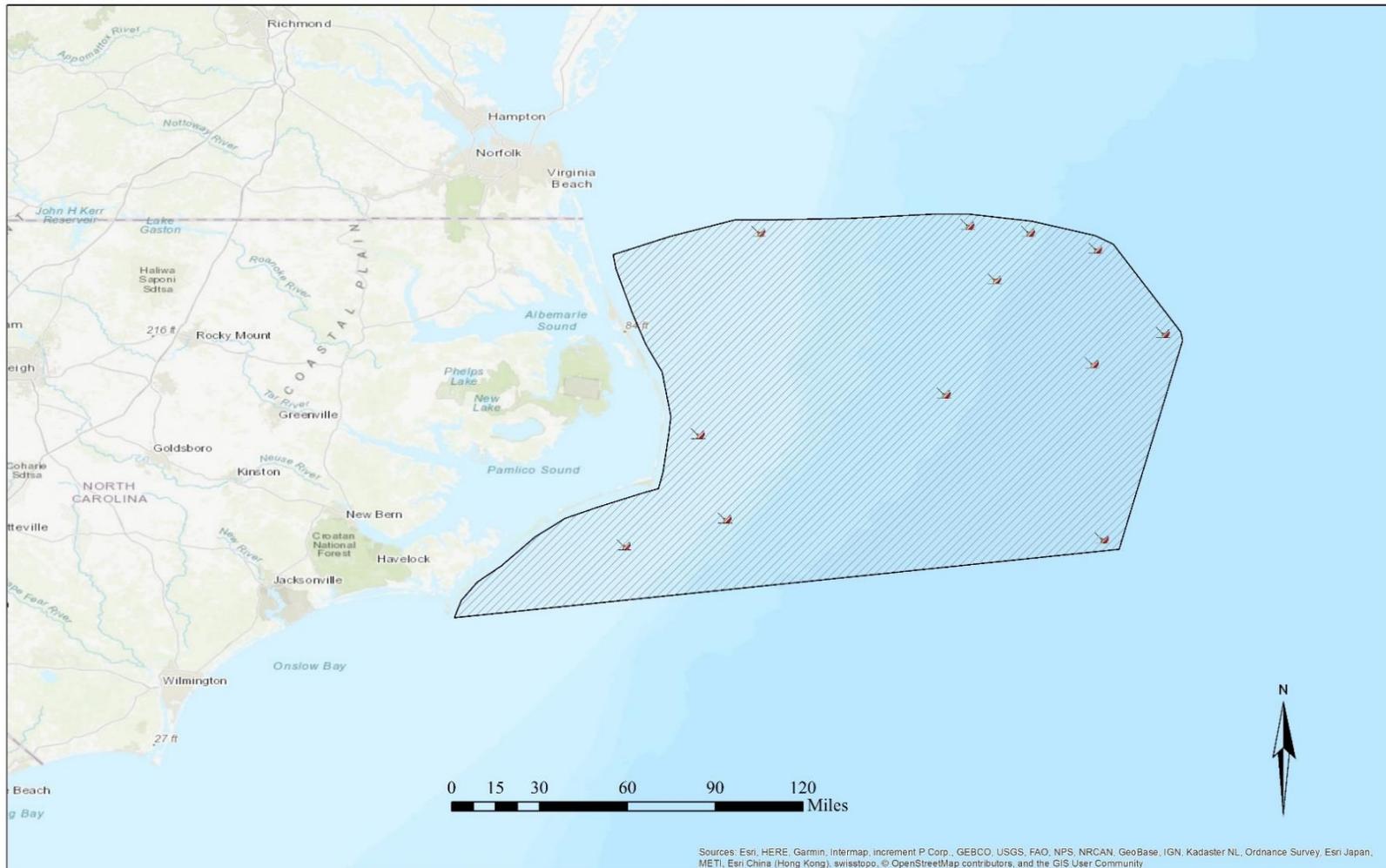
⊗ Symbol represents shipwreck or interaction between U-boat and Combatant/Non-Combatant

FIGURE 6.12. Rendering of the Battlescape (Map by author).



- ⊗ Symbol represents the boundaries of the Primary and Secondary battlefield
- ⚓ Symbol represents shipwreck or interaction between U-boat and Combatant/Non-Combatant

FIGURE 6.13. Rendering of the battlefield boundaries (Map by author)



- ⊕ Symbol represents the boundaries of the Primary and Secondary battlefield
- ⚓ Symbol represents shipwreck or interaction between U-boat and Combatant/Non-Combatant

FIGURE 6.14. Closer view of the core area of the battlescape (Map by author).

## **CHAPTER SEVEN: CONCLUSION**

### **Introduction**

This study followed a generalist approach to fully render a complete map of a maritime conflict. By looking at the overall actions of the ships as a day by day occurrence, sinking and encounter reports, and Captain's logs, contribute to the understanding of the battlescape. By using the previous work carried out by Wagner as a working guideline for the crafting of the battlefield, the central question of this thesis was displayed and answered. Though the dataset used to conduct this study is small compared to other conflicts in the region, they influence the human dynamics of the engagement and further instill the nature of warfare at the time.

All the chapters leading to the rendering of battlescape contributed to the production and understanding of the map. Chapter One outlined the parameters and questions to guide the study while showing examples of other work conducted by similar archaeologists. Chapter Two included the theoretical paradigm of generalist and battlefield archaeology, while Chapter Three showed the historical, archaeological, and geographical components obtained for this thesis and their applications to the production of this study. Chapter Four details the general historic timeline of events from before the war to the destruction of U-140 and U-117. This chapter identified key factors contributing to the battle. Chapter Five showed the basic results of the directionality, the entire actions conducted by all ships involved in the battle, and statistically examined battlefield events as well as nations and vessels affected by the conflict to provide a greater understanding of the multiple factors influencing the battle before revealing the geospatial trends. Chapter Six starts uses the geospatial methodology acquired from Wagner's study to produce the final maps of the battlescape.

All these chapter accumulate to produce a unique and one of a kind study of the First World War within the region. Though this thesis is based off the methodologies created by Wagner, it is distinctive and insightful on a war that has gone understudied for far too long. The history exemplified within this text is a tumultuous period featuring great technological change and the United States participation in world affairs, which ultimately escalated to the country being invaded by Center Power combatants. As Clark stated in the beginning of his book,

If they [the U-boats] are little known and less understood by the American public, it is because in their final stages the achievements of the American Expeditionary Force overshadowed the in the nation's press and the navy censorship permitted only the barest details to be printed (Clark 1929:7-8).

This thesis sheds new light onto an understudied portion of history that was actively suppressed by officials in power during the time in which destruction of the North Carolina coastline occurred. Despite this, the author hopes to continue a trend of influential and interesting scholarship on similar topics regionally and to formulate further studies on America and the Great War.

### **Answering the Primary Question**

Returning to the original question posed in Chapter One; What does the geospatial and statistical analysis of trends regarding First World War-era infrastructure, combatants, and noncombatants inform us about the naval battlescape off the coast of North Carolina? The primary narrative of the battle was quick, small scale, and generally non-violent, with a relatively low number of casualties between the two or more parties. All three submarines spanned different regions of

North Carolina's seascape. There is little to no overlap between U-boats geographically, however, collectively their actions define the extent of a battlefield. For the Second World War, Wagner's boundaries were established with the Eastern Sea Frontier (ESF) line used by the United States Navy and defined his boundaries with any historic events recorded east of Hatteras (Wagner 2010:136). There is no definitive line to study, nor dedication given by the United States Navy during the First World War. Despite this, there is a general pattern within the areas of interaction that shows a natural separation of the data, stemming from intercoastal to two rare instances (*Henrik Lund* and *U.S.S Pastores*) outside the general range. The boundaries are drawn from the first interaction (*Harpathian*) and the lowest geographic event (*Merak*). Although no U-boat was ever known to make landfall in North Carolina during the First World War, the close actions relating to the shoreline place the boundary close inland.

### **Answering the Secondary Questions**

At the beginning of this manuscript a series of secondary questions were posed. The first set of questions fall under the section; what were the main interactions between combatants off the coast of North Carolina? Nine ships were lost due to direct attacks from U-boats during the war. Five other ships were attacked and sustained no damage or were given a warning from the U-boat to carry on. One vessel, *Mirlo*, was lost to mine laying, and potentially other activities previously discussed. The primary nationalities of the vessels lost or damaged were: American, Norwegian, British, and Brazilian. The types of ships lost were merchant steamers, a bark, a schooner, a Coast Guard Vessel, and a tanker. Other ships involved in the conflict were two merchant steamers, a whaler, a destroyer, and a navy steamer.

The second section asks about the primary interactions and roles of the Allied and Central powers. The United States role was to defend the home front from enemies within their waters. Long before the war began the American government prepared for the invasion of U-boats and set patrols for certain areas along the Atlantic coastline. Combatants in the form of military craft were dispatched to aid in U-boat attacks (USS *Stringham* to *Uberaba*), or encountered enemy submarines while continuing their path (USS *Pastores*). Non-combatants and neutral nations carried the role as the suppliers of important supplies in times of war, as well as, sustaining the local and global economy. They also became the unfortunate victim throughout the war. Frequently these ships were carrying out their daily operations despite the world being at arms with one another. They usually had little to no warning of U-boats being in the area until it was too late and most lost their livelihood. Non-combatants were the highest target for U-boats, including every vessel within this dataset except for *LV# 71* (though this ship was unarmed), USS *Stringham*, and USS *Pastores*. The attack on neutral agents played into the most controversial order for submarine warfare at the time, allowing for ships like *Vinland*, *Vindeggen*, *Henrik Lund*, *Nordhav*, and *Uberaba* to be attacked. Ships from non-combatant and neutral nations contribute the most to the war. The roles given to the German combatants were to create chaos for the American public, to instill fear, and to sink as many ships as they could, while also collecting prize money and supplies. Often, the U-boat served as an almost benevolent figure that came to the aid of those they attacked and wished no ill despite engaging in wartime activities, this is the case for U-151 under von Nostitz, while others filled the role of a captain carrying out their orders and distancing themselves from their victims (U-117 under Drösher). Other roles include the American men working the lifesaving stations running across the eastern coastline, including the Chicamicomico Coast Guard Operation off Rodanthe. These individuals

served on the front line of defense and went to the aid of all ships effected by the German combatants.

The final selection of questions asks about the special elements of North Carolina's seascape, the reliability of coordinates of the potential locations of these shipwrecks, and the use of the boundaries by managers and interested parties in First World War heritage. North Carolina is the furthest extent German submarines traveled during the conflict and the seascape provided ample opportunity to take unsuspecting merchant ships running trade along the coast. The coordinates collected within this thesis may provide a working guide for those wishing to locate the resting place of these vessels. All represent the loss data collected by the United States Government and British Intelligence. The boundaries and data accumulated on the sinking locations provide a working guideline for any management plans to rediscover the missing shipwrecks and place protections on the material culture. The maps created in this thesis provide "hot spots" or areas of interest that are readily available for those interested in World War One heritage.

### **Observations**

Further observations from the battlefield map bring into question the significance of North Carolina within the war. The region itself is special as no recorded U-boat engaged in any warfare below Cape Lookout. No sightings were recorded despite the United States having prepared the entire Eastern Seaboard for any attack (Bell 1929:13). North Carolina became a stopping point for the three U-boats that dared venture into the area. Perhaps this marks North Carolina as the furthest point a submarine of the time could travel without needing to refuel but important strategic regions were left unperturbed in the wake of war. One suggestion as to why

shipbuilding and major transport areas such as Wilmington, were unreached was because of the formal adoption of the convoy system on June 3, 1918 by the United States Navy (Bell 1929:93). The use of armed vessels and sub chasers to escort ships to safety took weeks to organize but by the time U-140 and U-117 within North Carolina waters the system was active and highly effective. It seems to the author that as a cost benefit for later ships, it was better to hunt the ones hugging the coastline than to take on bigger vessels at war (though that could be countered by the behaviors shown by U-140 in the previous chapter). North Carolina was an area rich in trade and war production, ferrying much needed troops to France. As with the Second World War, the introduction of the convoy system in 1942 followed the wane in attacks from U-boats (Wagner 2010:190). Perhaps future studies with further context of the entire Atlantic campaign, may better explain the reason for this stopping point in the submarines long trek.

### **Avenues for Future Research**

This study is a small subset of an overarching and extensive war. The First World War was the first conflict to span across the globe with the advent of modern naval warfare. The sites off North Carolina are miniscule when compared to the extent of the cultural remains left behind. An area for future research would be a full picture study of the events off the United States and Canadian coastline, with the seven U-boats that attacked vessels during the summer and fall of 1918. One hope is for historians and archaeologists to take further interest in the archaeological signatures left behind from the First World War, on a local and global scale.

Currently there remains a great deal of work needing to be conducted by maritime archaeologists in North Carolina. As previously mentioned, the only ship located to date is the Diamond Shoals Lightship, and as the one-hundred-year anniversary approaches the urgency in

recording the lost sites increases. There is hope that professional agencies within the region will use the research collected by the author to potentially obtain the location of the remaining nine vessels in question. There is still more to rediscover as significant pieces in the historic record of the state. The importance is to find the remaining state of the ships, their level of protection from deterioration and human impacts. Another important reason to locate these vessels is to resolve details within the historic record. Currently it is debated within the local and scholarly community what the wrecking conditions were for *Mirlo*. Upon location of the vessel, one would hopefully be able to determine the exact order of events between torpedoing and/or mining by U-117. Finding the sites and obtaining details lost to the passage of time not only benefits our overall understanding of the period but adds to the history of the state. This benefits local stakeholders who have treated these stories as essential parts of their identity (in particular, the US Coast Guard's importance to the coastal community).

One of the interesting subjects brought to light within this study is the overall comparison of the actions undergone by U-boat captains in the First and Second World Wars. The variation of patterns in behavior, tactics, and interaction with actors in the theater of the conflict is vastly different in appearance. Despite twenty years separating the actions and a new generation of young men destined to fight in a large scale destructive war, there were seemingly limiting factors connecting the two together. For example, U-151 as shown in the previous chapters worked alone and extended kindness to almost all the ships encountered, whereas a successful German submarine in World War Two would never engage so closely with their enemy. There are avenues for research involving the difference in ship types, orders, diving capabilities, and avenues of communication between the different eras. The overall structure of organization under different regimes is a topic in of itself. A potential avenue of research for those captivated

by the human element of war, would be to research further into the differences and similarities, if they exist, during these two varying time periods.

Another small anecdote that personally interested the author was how did the destruction of the ten ships in this dataset play into the local and global economy of the time. Josephus Daniels mentioned in his writings that the loss of *Pinar del Rio* cost the United States roughly \$450,000, in the currency of the time (Daniels 1920:45). Captain Ballestad of *Henrik Lund* relayed to the U.S. Navy that the cost of goods on board *Vindeggen* was over one million German Marks in past currency (Ballestad to Daniels 1920:45). For an expert on the subject it would be interesting to see the economic impact to America, Britain, Norway, and Germany with the loss or damage to vessels, and the cost of outfitting a submarine for a 3,000-mile journey. This could be a future avenue of research for an economic historian or someone interested in the cost-benefit analysis to the war.

A final avenue for research is looking at the individual U-boat Captains and their personal histories. Arguably the shape of the battlescape was determined by the officers preying on ships off North Carolina and their individual agency transpired the events depicted in previous chapters. An insightful study into the backgrounds of von Nostitz, Kophamel, and Drösher may yield more information influencing the decisions made during their time in the Americas. Any background on their training regimen and personal history in the Imperial German navy could add to the available history. In order to obtain this information, a researcher would have to be fluent in German and study German archives to find such material. At this moment the author does not know where such sources could be obtained or if they even exist but poses a challenge to any individual interested in the topic to pursue this further.

## **Conclusion**

While the primary question of this thesis was to answer what the geospatial and statistical analysis of the conflict could express about the battlescape itself, this research does not represent itself as a singular or definitive interpretation of the events that took place. Furthermore, this thesis does not direct any agency towards the protection of sites. The author hopes more research will be conducted in the future by those fascinated with the subject of World War One on the American home front, and that other studies will further validate or provide more aspects to this battlescape study. Now is the time to revisit the First World War heritage strewn across the coastline, as the sites hit their centennial mark. Following the global trend in revisiting the painful history of a violent conflict, it is important to remember the bravery held by those participants in the “War to End All Wars.”

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