

FRANKLIN DELANO ROOSEVELT'S INTENTIONS TO ENTER WORLD WAR II:
AN ARCHAEOLOGICAL AND HISTORICAL EXAMINATION.

By

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During the first two years of World War II (WW II), the United States, spear-headed by President Franklin Delano Roosevelt, took a stance of neutrality to the political upheaval and physical carnage of Europe. Only after the attack at Pearl Harbor on December 7, 1941 did the United States break from its isolationist posture. Numerous textual sources document how backroom meetings and the political mastery of FDR may have helped garner support for joining the fight in Europe. In order to test these stories, I plotted the locations of known US merchant vessels sunk in the Atlantic prior to the attack on Pearl Harbor to determine if the spatial distribution of these vessels would show corresponding signs of subversion, refute written records, or verify the record. My preliminary analysis of the archaeological record does not completely corroborate or necessarily contradict the written records. It does, however, demand further investigation.

ACKNOWLEDGMENTS

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Finally, I would like to thank my parents for never giving up on me, even when they probably should have. If it was not for their patience and much needed assistance when the cards were down I may have never made it back, and I may have never been afforded this opportunity. Thank you very much for being there for me.

INTRODUCTION

Franklin Delano Roosevelt (FDR) possessed the qualities of a spymaster proficient in the ways of espionage. This is to say that he was highly adept at compartmentalizing information and strategy by keeping secrets both among and from his closest allies. He was quoted saying, “You know I am a juggler, and I never let my right hand know what my left hand does” and “I may be entirely inconsistent, and furthermore I am perfectly willing to mislead and tell untruths if it will help me win the war” (Persico 2001:xi-xii). Historian David Stafford even refers to FDR as “impenetrable, enigmatic, secretive and Machiavellian” (1999:2). It has been postulated over the years that the thirty-second President of the United States, Franklin Delano Roosevelt, was not as forthcoming with his motives for US involvement in the Second World War (WW II) as he presented himself to be (Persico 2001; Stafford 1992:xiv).

Furthermore, on Thursday December 4, 1941, just three days prior to Japan’s attack on Pearl Harbor, the *Chicago Daily Tribune*, an isolationist newspaper publisher, posted a front-page headline of FDR’s secret war plans for World War II (Bailey and Ryan 1979:223-5; archives.chicagotribune.com). Figure 1 shows the Chicago Tribune’s front-page headline with a cartoon of people that represent the states looking on toward Washington D.C., which is portrayed as a propaganda hub pushing the US public toward war. This image demonstrates that the sentiment that FDR was pushing for US involvement in World War II has been around since prior to the United States entering the conflict.

2 CENTS
PAY NO MORE!

Chicago Daily Tribune
THE WORLD'S GREATEST NEWSPAPER

FINAL

VOLUME C—NO. 290 C THURSDAY, DECEMBER 4, 1941.—46 PAGES PRICE TWO CENTS

F. D. R.'S WAR PLANS!

REDS BEGIN NEW DRIVE TO BREAK VISE ON MOSCOW

LEIBER TRADED TO GIANTS; CUBS GET BOWMAN

HOUSE ADOPTS DRASTIC BILL TO BLOCK STRIKES

GOES TO SENATE ON 252-136 VOTE.

THE STRONGHOLD OF PEACE

GOAL IS 10 MILLION ARMED MEN; HALF TO FIGHT IN AEF

Proposes Land Drive by July 1, 1943, to Smash Nazis; President Told of Equipment Shortage.

REVEAL TURKEY GETS LEND-LEASE GOODS SINCE MAY

BY WALTER TROHAN.

Figure 1. December 4, 1941 Chicago Daily Tribune article displaying concerns of propagandist behaviors in Washington D.C. (archives.chicagotribune.com).

Though separate avenues of research have been conducted on WW II in regards to both FDR and England's Prime Minister, Winston Churchill, as well as records of U-boat attacks in the Atlantic Ocean and analytical data of sunken merchant vessels that they engaged, (Helgason 2016a; Meacham 2004; Rohwer 1999; Veronica 2015), I have not found a resource that combines all of these levels of research to tell a more holistic and unbiased story of events that led the United States to enter WW II. Further, I feel that though the multitude of works on the subject is indispensable, the fact that all of the elements remain separated by field of study only serves to provide individual and limited glimpses into the relationship of interactions between the United States, Britain and Germany prior to and during World War II. By analyzing a multitude of historical documents and studying the archaeological record, the objective of this

paper is to investigate the validity behind the hypothesis that FDR had intentions for entering the European conflict, even prior to the Pearl Harbor attack (Langer and Gleason 1953; Meacham 2004; Persico 2001). This historical information is compared with the physical data of the era's various shipping lanes between the United States and the United Kingdom, to determine if the distribution of U-boat attacks on US vessels can show that FDR was using the attacks as a method of propaganda to incite the US public into a sentiment of retribution and war. Finally, the distribution of sunken Allied merchant marine vessels and their cargoes, as recorded in historical reports (Rohwer 1999:53-74; uboat.net), were plotted on a new GIS map utilizing the Google Earth Pro system (Google Earth Pro 2016). The resulting GIS data was applied to the study in order to further shed light on the political motivations of FDR. By helping to provide visual representation of the paths that US vessels were traveling, the system of plotting the paths of travel helps to clarify whether or not these paths were chosen for safety purposes, or for the purpose of putting vessels in danger in order to elicit a US public outcry.

Supplying the English war effort, while officially claiming neutrality, was a dangerous tactic for the United States in terms of international relations. By supplying the Allied effort against the German invasion of their European neighbors, the United States balanced on the edge of neutrality and blatant participation with the Allies, and risked angering the Axis Powers (Griess 1984:205, 212). As a result of this balancing act, a number of so called neutral vessels under the US flag were attacked by Nazi U-boats in a German effort to diminish the fighting capabilities of the English (Griess 1984:205; Rohwer 1999:53-74).

This paper examines physical evidence along with the written records regarding World War II, rather than just the historical evidence, to better understand the validity behind the hypothesis that FDR had ulterior motives for the US entrance into World War II. It is important

to match written history with the physical realities when trying to explain why certain things may have been done. There has been a high degree of interest in the subject of the US entry into a second European conflict in as little as twenty-five years after the First World War, especially considering that the people of the nation, by and large, swore that they wanted no part of a second European conflict (Stettinius 1944:2). Therefore, this paper also attempts to bridge the gap between studies of differing fields in order to facilitate further research in this area.

By analyzing the spatial distribution and payloads of various US vessels alongside historical documents, I investigate the hypothesis that FDR was bolstering US national support for joining the war by intentionally placing US vessels in known regions of U-boat activity. This study seeks to reveal whether the reported outcomes of particular encounters and recorded history are an accurate portrayal of past events, or nationalistic subversion by the US leadership during the events leading up to the United States entering the war. Through a deeper understanding of US political and international relations, this project may help to shed light on the overall character of the population of the of the United States as a nation, as well as provide an archaeological component to an ideological and intellectual frame of study in order to facilitate further archaeological and anthropological research efforts.

An underlying assumption of my research is that the actual spatial distribution of US ships sunk prior to US involvement in World War II tells us much about US intentions for joining the war or remaining neutral. Plotting the ships' approximate and actual locations of rest, and comparing these locations with expectations that would resemble neutrality or aggression, may give new insight into the strategy of events that led up to the US entry into the war. Again, the simple act of plotting resting places for vessels engaged in conflict is insufficient evidence for making claims of intent. The historical record, therefore, is crucial in telling the whole story.

Expectations of this study

One could naturally expect that the US public would demand retaliation if US vessels and lives were being unduly taken by German aggression in the Atlantic Ocean. This is the basis of the hypothesis that FDR may have been endangering US ships in order to prompt the US public to a state of excitement that would lead the country to join the war. I identified material expectations for both of FDR's possible strategies (Figure 2). If FDR was purposefully putting US merchant vessels in a situation that would invite attack from German U-boats, the archaeological record should look very different than if FDR was attempting to avoid conflict. If FDR was putting US vessels in regions of the Atlantic Ocean that were highly populated by U-boat patrols, one would expect the record to show a relatively high degree of attacks and sinkings in these regions.

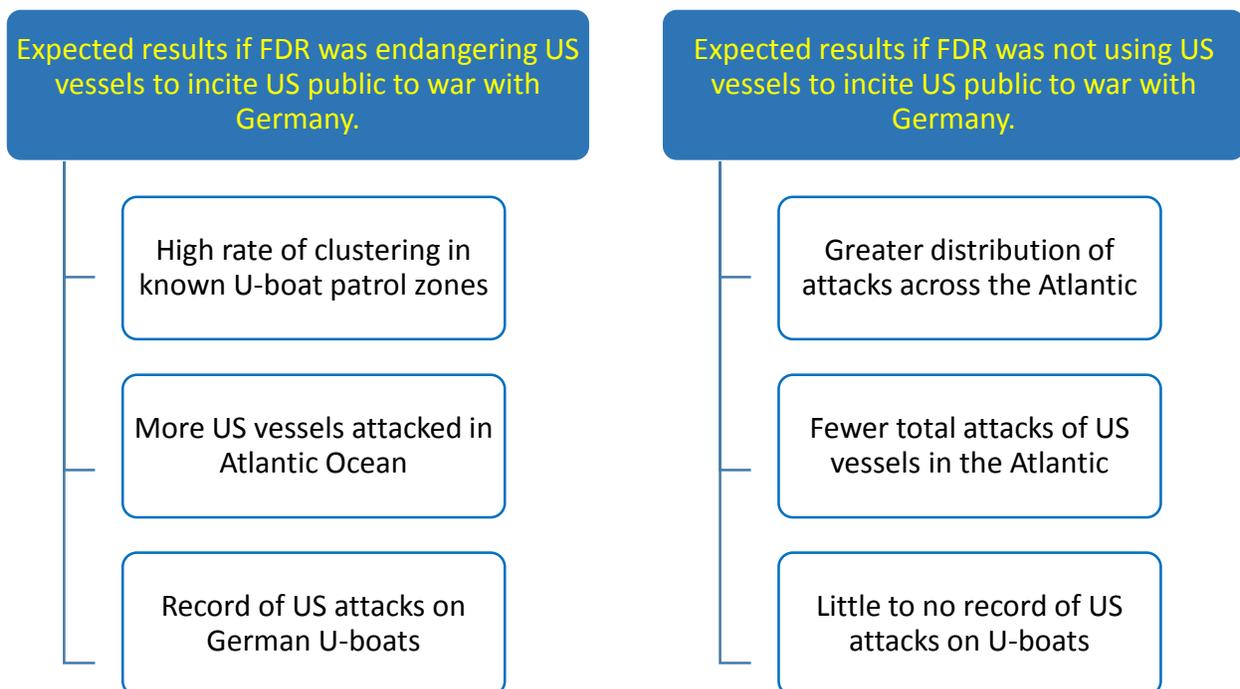


Figure 2. Expected results of study for, both, FDR seeking and avoiding conflict during World War II.

Since the United States was supplying Britain with materiel in their efforts against Germany (Stettinius 1944:3-4), the expected regions of greater attacks, which would support the hypothesis, would be in the German blockade region surrounding the British islands (Figure 3). This would be the case particularly in the North Atlantic, between the United States and Britain, and along the major peacetime shipping lanes between these two nations (Figure 3). If FDR was avoiding conflict, one would expect to see fewer US vessels attacked in the North and Mid-Atlantic, particularly in the German blockade zone. Therefore, there would be fewer sinkings and a relatively smaller dataset to investigate.

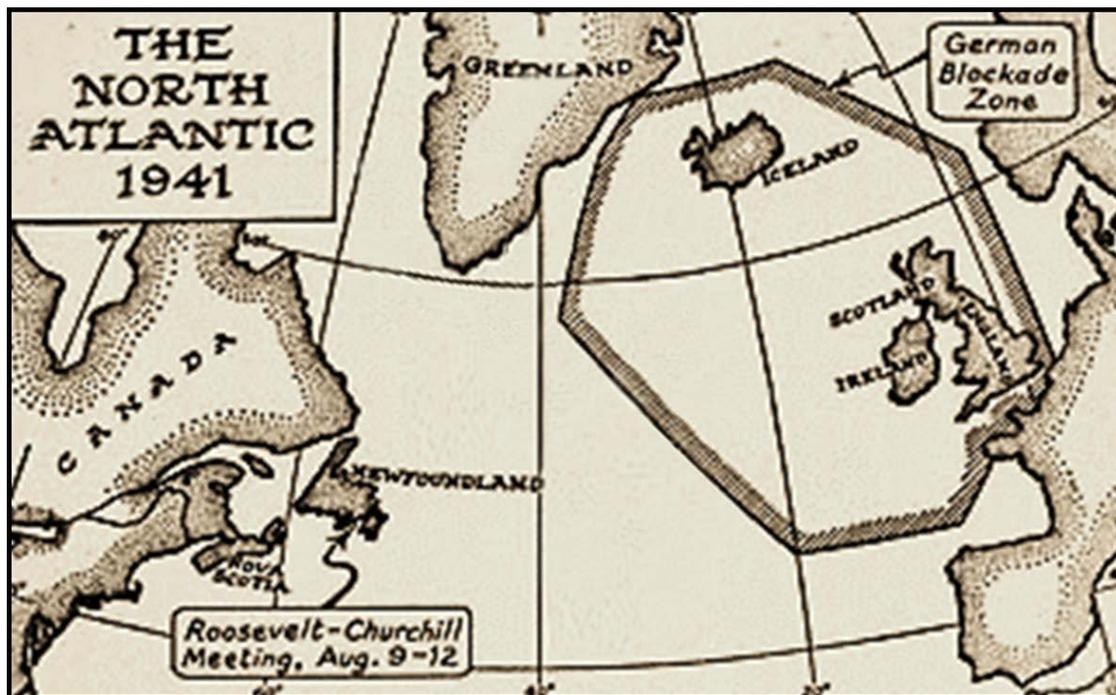


Figure 3. A graphic of the German blockade on Great Britain and Iceland at the time of attacks on US vessels in 1941 (adapted from Bailey and Ryan 1979:170).

Figures 3 and 4 represent the area where one would expect to find clustering of US vessels. This area covers the peacetime shipping lanes between the United States and Britain, and straddles the western border of the German blockade zone of the British Islands (Figure 3). If FDR was putting merchant vessels or naval personnel in harm's way, the region marked in

Figure 4 should be populated by a higher density of wreckage than the surrounding regions of the Atlantic Ocean.

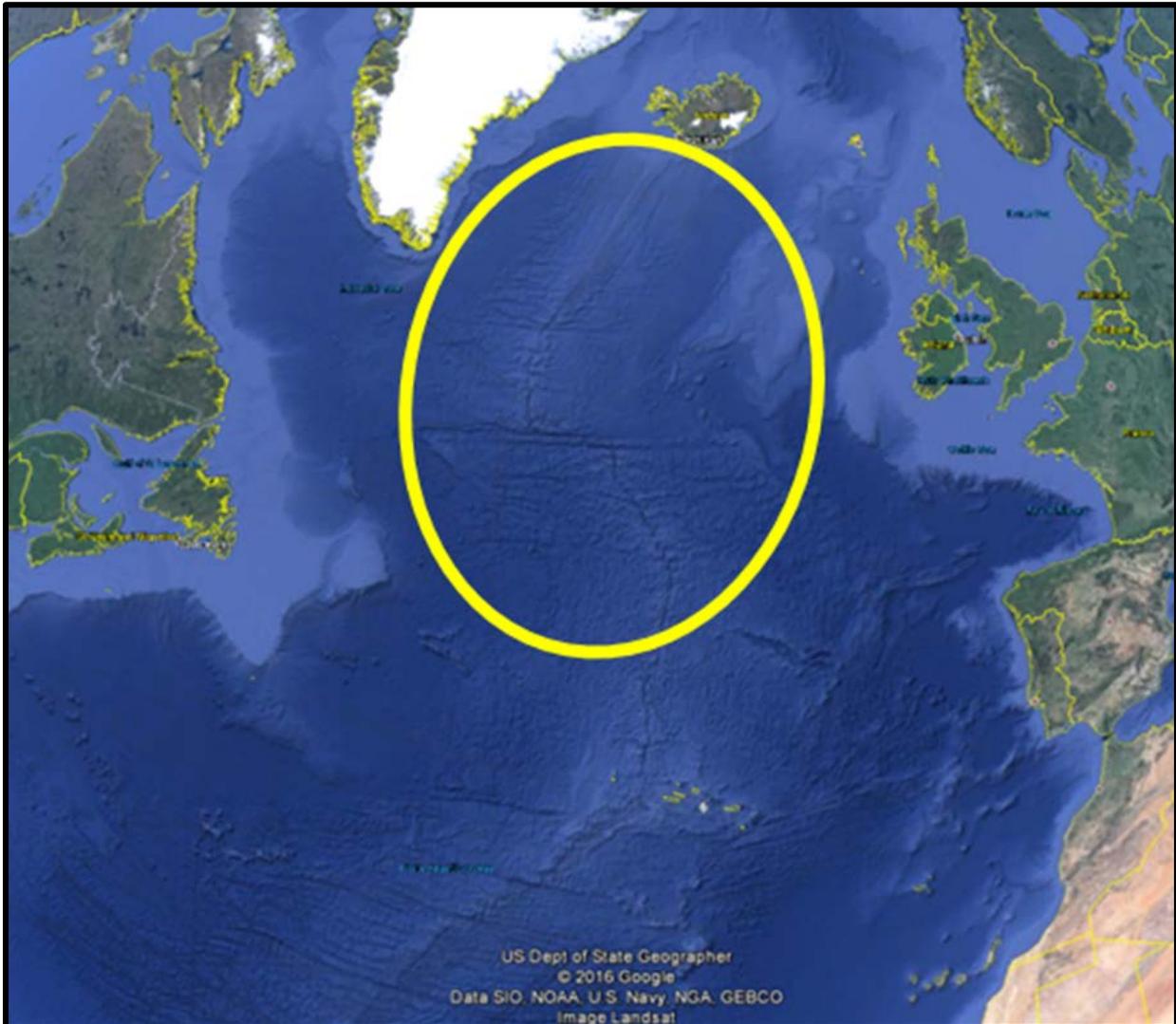


Figure 4. Expected area of higher than average/clustering of wreckage if FDR was endangering US vessels to incite US public to war with Germany (Google Earth Pro 2016).

BACKGROUND

Historical Background

Europe's clash for territorial domination in the First World War (WW I), ended in 1918 with the defeat of Germany and its allies, but the Treaty of Versailles, signed on June 28, 1919, only paused the struggle for a mere twenty years (Griess 1984:xi-xii; nytimes.com). In 1939 the *Nazis* (National Socialist German Workers' Party), under Adolf Hitler, ignited a continent-wide conflict in Europe that would eventually force to arms much of the world, including the United Kingdom and the United States (Griess 1984:xi-xii). As Hitler and his Nazi regime rearmed militarily pushed through Europe, Great Britain and its colonial land holdings around the Mediterranean fell under German attack. Soon, Britain would be the region's last holdout for continental freedom (Langer and Gleason 1953:xiii; Stettinius 1944:2-3). England needed help if the *Nazis* were to be stopped, however, after its entanglement in Europe's previous continental conflicts of World War I, the people of the United States had no desire to repeat past events on the other side of the Atlantic Ocean. The United States government would, instead, enact and revise a series of bills that would edge the people of the nation ever closer to open conflict.

Major Players: The United States

As laid out by international law, neutrality is a declaration that the government of a nation may take at times of war between neighboring nations, which states that the declaring nation will not

provide any kind of preferential or discriminatory treatment to any nations engaged in the conflict. Furthermore, there were specific rules laid out within such documents as the Declaration of Paris (1856) and the Declaration of London (1909) in order to facilitate neutrality (Kennedy 2007:41). The purpose of a people declaring their nation as neutral is to afford them the right to avoid becoming entangled in the war of belligerent nations, thereby avoiding the loss of lives, financial obligations in funding a conflict and the rebuilding of the nation in the potentiality that the conflict would reach US soil.

Neutral or Nonbelligerent? What was different in the case of World War II, however, is the development of the concept of neutrality toward a concept of “nonbelligerency” (Kennedy 2007:41). Nonbelligerency, as understood by numerous nations during WW II, utilized the previous understanding of neutrality, but was driven more by ideology than cold hard laws. In this way, a nation would claim that it was nonbelligerent in order to avoid the before stated consequences of war while retaining the ideological right to display preferential or discriminatory treatment (Kennedy 2007:41-2). That is to say that the citizens of nations such as the United States, that wished to remain neutral, still had certain ideas toward morality, national/world security and commerce and political ideals, so chose to favor or condemn either belligerent party while avoiding conflict, themselves. Figure 5 illustrates the fluctuation of US sentiment along these concepts as the war progressed from 1939 to 1941.

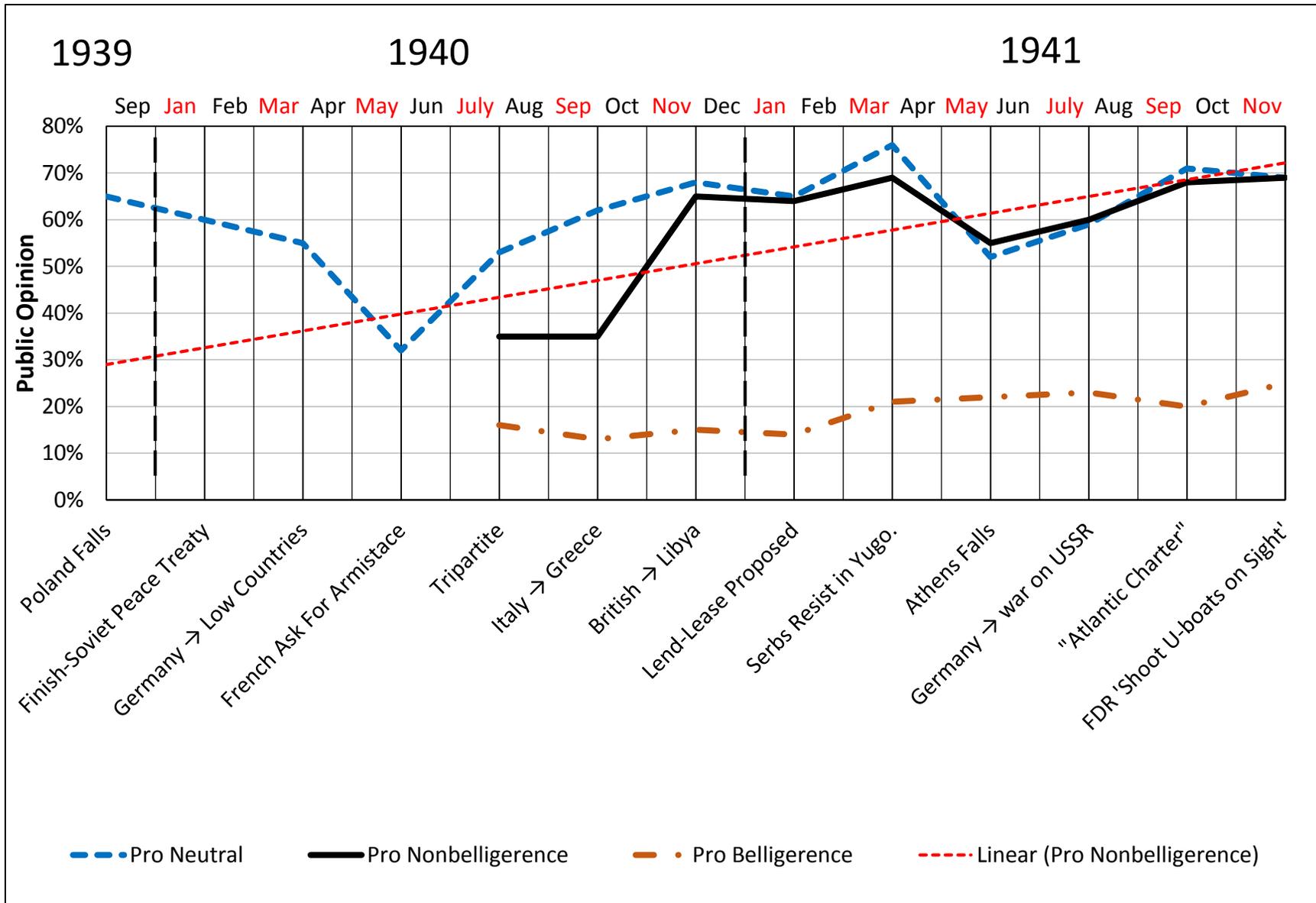


Figure 5. US Public Opinion toward participating in WW II as recreated by Author (Brown and Herlin 1942:106).

Political Landscape: Prior to Japan's bombing of Pearl Harbor, and the official involvement of the United States in World War II, on December 7, 1941, most citizens of the United States were decidedly against entering another European conflict (Figure 5) (Doyle 2013:180; Langer 1953:xiii-xiv). Though the general public of the nation believed in being a good neighbor to its allies, after World War I just 20 years earlier, many could not justify allowing for the nation to endure the same kind of US death toll and destruction that it had previously endured (Stettinius 1944:2). However, with the help of his charismatic storytelling, using metaphors like the loaning of a garden hose to a neighbor whose house is on fire, and his political savvy, Franklin Delano Roosevelt would be able to slowly turn the tide of US public opinion (Stettinius 1944:1-5). The citizens of the United States would slowly become partial to the reality of supplying the Allies' war effort while officially remaining neutral, though, as the trend shows in Figure 5, the United States could not remain so for long.

Like the people of Great Britain, those of the United States tried to avoid the war on mainland Europe for as long as they could. Due to a strong sense of fear and disdain for war after the happenings of WW I, the government of the United States passed a series of bills that essentially isolated the nation from the rest of the world. The citizenry of the United States hoped that they might be able allow the political and physical turmoil of Europe to settle itself. However, it may have been US fear or complacency that partially created a war on such a grand scale (Stettinius 1944:2-3). By failing to take action and sanctioning Hitler for his numerous violations against the Treaty of Versailles, and/or by waiting so long to send military aid to Britain, the war may have been allowed to grow out of control when it could have been more easily taken care of at an earlier stage (Griess 1984:xi; Stettinius 1944:3).

Major Players: The United Kingdom

Political Landscape: As Hitler and the Nazi Party took power in Germany, the United Kingdom did what it could to avoid a second conflict in twenty years. As early as February 1934, Britain knew that Germany was in violation of the WW I Treaty of Versailles by building a large number of war planes. However, Britain did not correct the violation due to a desire to control the violation through further treaties (Goralski 1981:27). A year and half later on June 18, 1935, Germany and Britain signed what was tantamount to a German naval rearmament treaty, known as the London Naval Treaty. In this way, Britain was the first European nation to falter in the face of German violations, allowing Germany to rebuild its surface and submersible navy as long as it remained 35 and 45 percent the size of the British surface and submersible fleet, respectively (Goralski 1981:34; Griess 1984:11). It would not take long for Britain to reap the results of staying neutral, while allowing Hitler to violate the Treaty of Versailles and rearm Germany.

Upon the German invasion of Poland on September 1, 1939, Britain and France sent warning to Hitler that they would assist Poland unless he terminated all aggressions in the region. Hitler failed to heed the warning from France and Britain, and on September 3, 1939 Britain, France, India, Australia and New Zealand were forced to declare war on Germany (Goralski 1981:91). In ten short months Britain would, like the rest of Europe, be under siege by Hitler's forces.

The Battle of Britain: After Germany had defeated Britain's former World War I allies, including France, the only obstacle between Germany's new airfields in France and the little British island was the English Channel. Less than one month after the armistice with France,

England came under German air attack on July 10, 1940 (Doyle 2013:155-7; Griess 1984:51). Fortunately for the United Kingdom, the Luftwaffe (German air force) was unable to clear the skies over the channel for a German land invasion by sea. As a result of being unable to destroy Britain's Royal Air Force (RAF) and thereby setting the stage for an army invasion, Hitler was forced to temporarily turn his desires for more land elsewhere (Griess 1984:51). Having fought off the Luftwaffe onslaught, England narrowly escaped the fate of mainland Europe.

Though England's RAF was successful in stopping Hitler's efforts toward an all-out invasion, Southeastern England's maritime operations, RAF aircraft and landing strips, military bases and lines of transportation remained under attack to clear the way for a later invasion. These strategic targets remained the *Luftwaffe's* object of attack until, while on a night raid, a bomber became lost, and accidentally bombed London on August 24, 1940 (Doyle 2013:157-8; Griess 1984:74, 78). After the accidental bombing of London, Winston Churchill responded, in kind, by sending RAF bombers to attack Berlin on the following day. Prior to these two attacks on civilians, England only had to fear attacks on its war supporting industry, but after Churchill's retaliation on Berlin, the stage was set for a change in strategy from both sides. From this point forward, the citizens of England's major cities were under the constant threat of German air raids known as the *Blitz* (Doyle 2013:157-8; Griess 1984:74, 78).

Major Players: Germany

In 1919 the Germans were forced to sign the Treaty of Versailles as the result of losing World War I. Article 231 of the treaty stated that the German people were the main instigator of aggressions, and that they were to take full responsibility for their allies' and their own actions in the war (Hacken and Plotke 2001). This was a particularly demoralizing article for both the

people and the military, but their resentments toward the treaty would be compounded. The treaty also stated that Germany must effectively dismantle the vast majority of its military powers, relinquish portions of its national territory to surrounding nations and pay hefty reparations for damages caused by its aggressions (Doyle 2013:8; Griess 1984:2).

Political Landscape: With the people and military of the nation disheartened by the harsh sanctions of the Treaty of Versailles, the “spiraling hyperinflation of the German Reichsmark by 1923” (ushmm.org) and the depression of the 1930s was enough to set the political stage for civil and political unrest (Griess 1984:8). Adolf Hitler, through his fiery oratory and nationalistic ideals, was able to unite and reignite the hearts and minds of the German people toward the ideas of nationalism, rearmament and future glory. Through his political savvy, Adolf Hitler was able to capitalize on the national sentiment of despair and anger, and rise through the political landscape. By 1933 he had ascended to the position of Chancellor (Doyle 2013:8; Griess 1984:8, 11). Hitler had taken his National Socialist Party (Nazi) to the heights of German government. Furthermore, by the early months of 1935 Hitler had begun the process of renouncing the Treaty of Versailles, and began rebuilding Germany’s military forces and its operating procedures (Griess 1984:8-19).

Rearmament for War: Throughout the first five years of Hitler’s reign, Germany had largely remained relatively peaceful to its neighbors. From 1936 – 1938, Hitler employed threats and coercion on his neighbors in order to expand Germany’s territory. That is until his military attack on Poland on September 1, 1939, initiating the start of World War II (Griess 1984:19, 21). From this point forward, the German military swiftly swept west through Europe conquering its opposition, and on June 22, 1940 with the signing of an armistice (cease fire), Hitler had

succeeded in the taking of France (Doyle 2013:41; Griess 1984:45-50). Having brushed through Western Europe in a few short months, the United Kingdom was next in line for attack.

The Battle of the Atlantic

The Battle of the Atlantic was a five year long battle that took place largely between Germany and Great Britain from September of 1939 to December 1941 when the United States entered the war. From this point forward, the battle was between Germany and the two allies, the United States and Great Britain, until Germany's defeat in World War II in May of 1945 (Griess 1984:205). The battle was a direct result of Hitler realizing that he could not invade Britain by wearing them down with aerial raids alone (1984:209). Understanding that Britain was greatly dependent on her seafaring commerce as a result of being a small island, Hitler decided on a naval blockade of the subcontinent. The idea was to starve Great Britain of the material needed to continue their fight, and therefore, was an extended series of naval battles between the superior US and UK naval surface ships and Germany's furtive U-boats (Griess 1984:205). Therefore, this was a battle of attrition that relied on the ability of the German U-boats' stealth and concealability to prevent as much supplies as possible from entering the UK while, at the same time, losing as few U-boats as possible.

Ironically, Germany's ability to affect and sustain their blockade on the United Kingdom was a consequence of the *London Naval Treaty* mentioned above (Goralski 1981:34; Griess 1984:11). Without this treaty, it is highly likely that the Battle of the Atlantic would have never occurred, at least to the scale that it had. As a result of this treaty, Germany was afforded options in rebuilding her naval forces. The navy was allowed to build as long up to, but no more than, 35% of the displacement tonnage of the British fleet, but being that most nations saw the

submarine as ineffective due to their performance in World War I, submarine tonnage was up to 45% of that of the British fleet (Griess 1984:11, 208). Therefore, by September 1, 1939, in the face of Britain's superior surface fleet, the German navy was in possession of between 56 and 57 U-boats (Doyle 2013:23; Griess 1984:12).

FDR's Opportunity

By December 1940, the British were the last stronghold between the aggressions of Nazi Germany and the Americas. It was in the spring of this year that Americans truly began to see that their hopes for remaining isolationist were in serious jeopardy (Stettinius 1944:3). With the vast majority of Western Europe in turmoil, and the French ports and airstrips under German control, England was all that stood in the way of a potential German attack on the United States (1944:35-7). For the United States to militarily help so-called belligerent nations, however, was a potential violation to previous policies like the *Kellogg-Briand Pact*, whereby signing nations denounced aggression, and "...pledged that they would not resort to war as an instrument of national policy" (1944:2). However, the United States government believed that it did not have to be bound to the *Pact* since the Axis nations had already breached the contract (1944:81). If the United States was to help the fellow peace loving nations of Europe and prevent the German military from eventually landing in the Western Hemisphere, there would have to be a certain degree of reinterpretation of previous bills, as well as the creation of new bills.

Destroyers for Bases Agreement: Announced on September 3, 1940, the United States had previously assisted the British war effort by signing the Destroyers for Bases Agreement. In this agreement, Britain was granted fifty much needed decommissioned US destroyers in return for a

99 year lease of British navy and air bases in the western hemisphere. The Destroyers for Bases Agreement allowed the British to continue their efforts against German U-boats in the Atlantic while relieving them of the need to defend some of their far-flung bases (Bevans 1974:551-4; Goralski 1981:130). At the same time, in consideration of the German military potentially landing a beachhead in South America or the Caribbean, the United States was given bases that it may need in order to defend itself from attack (Stettinius 1944:40). As late as 1943, 45 of the 50 WW I era destroyers were still in action, the other five having been sunk while on convoy escort duties (Stettinius 1944:34). Though so few of Britain's new destroyers fell prey to German U-boats, the Destroyers for Bases Agreement would not be enough to supplement the British in their struggles against the might of the German onslaught, and the United States would endeavor to further assist.

H. R. 1776: The Lend-Lease Act of 1941: In order to further help the democracies of Europe, and after much debate, the Lend-Lease Act was signed into law on March 11, 1941 (Stettinius 1944:85). The Act allowed the United States to "...supply munitions, equipment, and other military supplies to its allies" (Doyle 2013:30). The opposition to the bill argued that there was not a clear and present danger to the United States, and if the US was to come under attack, the nation should simply rearm and build defenses for US soil. Secretary of State, Henry Stimson, warned against the sentiment of the opposition by stating that it was not enough to build defenses and let the enemy slowly plan an attack. Rather, Stimson maintained that the best defense of the United States would be to help the nations that are engaged with Germany, so that those nations may prevent an impending attack of the United States (Stettinius 1944:79-80). The very same day that President FDR ratified the Lend-Lease Act, he put into effect two directives. The first was to declare "...the defense of Great Britain vital to the defense of the United States"

(Stettinius 1). In this way, the United States was effectively free to join the war against Axis aggressions without officially entering the war. It had, in the name of self-defense, chosen the side of the belligerent nations of the Allies in order to stop the belligerent Axis nations.

Archaeological Background

There has been quite a bit of archaeological information gathered and actions taken with US destroyers and merchant vessels post-entry of the United States into World War II. Since the Battle of the Atlantic, the fate of the sunken vessels involved has varied greatly. Some vessels are protected as heritage sites, war graves, or environmental sanctuaries, while others have been classified as environmental hazards and even hazards to human life. However, site reports or physical data on the particular US destroyers and merchant vessels that were sunk by German U-boats prior to the official entry of the United States into World War II were inaccessible. Therefore, in this section I provide two case studies for sunken WWII vessels. The first case study looks at how archaeologists have investigated the remains of a naval battle between a German U-boat and a US merchant tanker off the coast of North Carolina. The second case study examines the cultural implications of protecting sunken cultural heritage sites in the face of economic and cultural interests.

The Need to Protect and Honor

In England, for example, a number of sunken vessels from World War II have been designated under the 1986 *Protection of Military Remains Act* as ‘protected places’ or ‘controlled sites’ (Cadw 2009:10). In this way, many of the known vessels in the Atlantic Ocean and off the shores of Britain are restricted to divers, as well as left to nature. This type of outlook on the

sunken vessels of World War II is not held by those in Britain, alone. In fact, both Germany and the United States share their sentiment.

Separated by a mere 240 hundred yards and just thirty miles off of the North Carolina coast of the United States, the remains of a German U-boat, *U-576*, and a merchant tanker, the *Bluefields*, serve as reminders from the Battle of the Atlantic. Though the *Bluefields* was en route to the American Keys from Norfolk, Virginia, and not to the European continent, the remains are actual physical evidence of a particular battle from the Battle of the Atlantic, as well as a testament to how close to US shores World War II actually came (MNMS 2014). In order to “survey and document vessels lost during WWII off the North Carolina Coast” (MNMS 2014), archaeologists of the Bureau of Ocean Energy Management (BOEM) and the National Oceanic & Atmospheric Administration (NOAA) conducted a joint effort in 2008. Through the study of historic documents as a result of this joint effort, the location and identity of these two vessels was confirmed (MNMS 2014).

Though there were no casualties of the *Bluefields* as a result of the *U-576* attack, *Bluefields* is still considered to be part of the site of the *U-576* site. Furthermore, the United States recognizes German ownership of the U-boat under international law. When these two concepts are taken into account and combined, the United States chose to designate the *Bluefields* as a portion of the war grave for the crew of *U-576*, and assumes the responsibility of protecting the site for today’s Federal Republic of Germany (MNMS 2014).

Archaeological Methods: The primary method used to locate the *Bluefield* and *U- 576* was a survey suite that consisted of two remote sensing packages utilizing acoustic imaging. This survey suite allowed the team to locate large and small objects on the seafloor while, at the same time, enabling them to view large portions of the seafloor. In this way, the team was able to

locate 47 targets, and designate seven of these targets as potential shipwrecks. As a result of this fieldwork, both the *Bluefields* and *U-576* were imaged through high-resolution sonar which yielded high quality images of the two vessels (MNMS 2014). Figure 6 and Figure 7 are examples of the quality of imagery that was captured by the team.

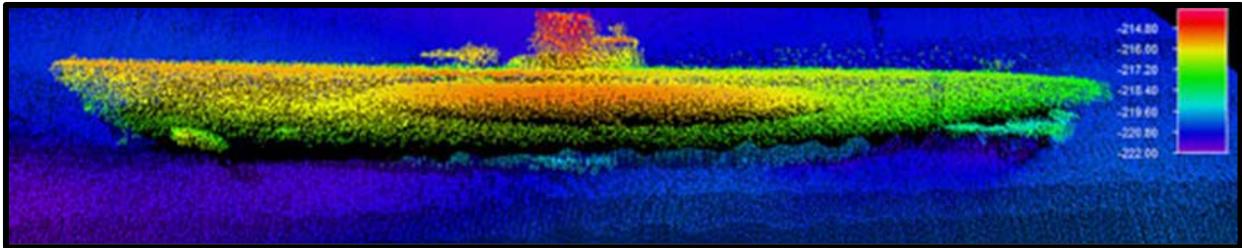


Figure 6. Sonar image of U-576 sunk approximately 30 miles off of North Carolina coast (<http://monitor.noaa.gov/science/u-576-searching.html>).

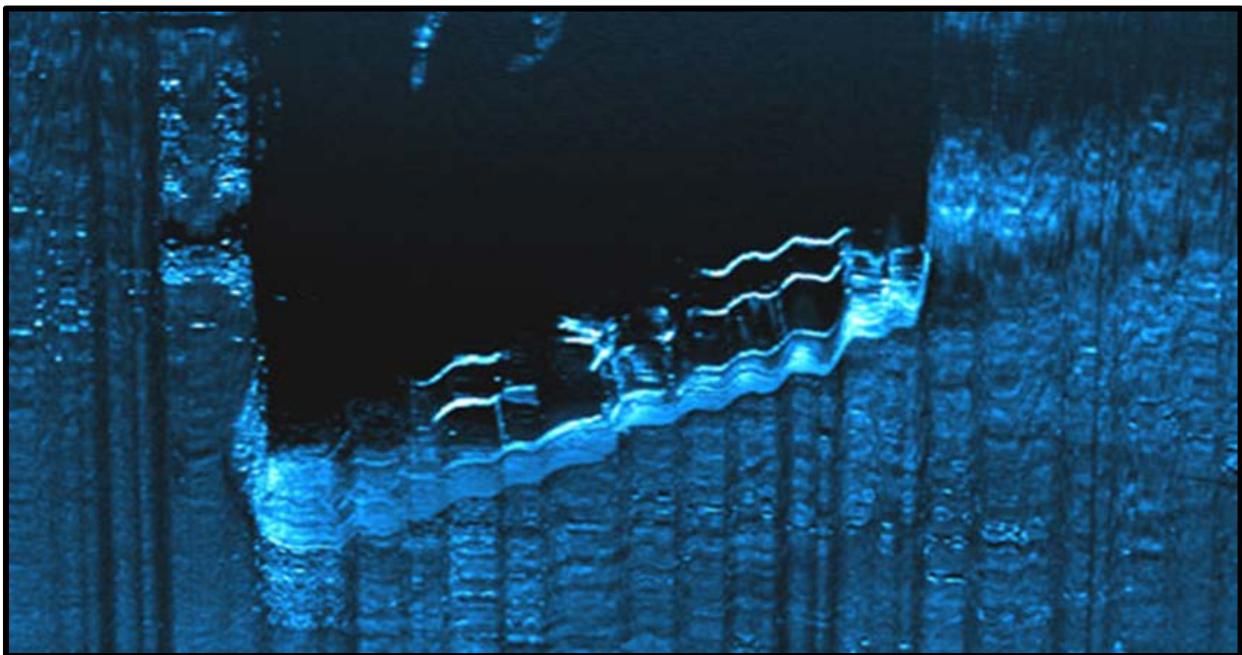


Figure 7. Sonar image of Bluefields, sunk by U-576 approximately 30 miles off of North Carolina coast (<http://monitor.noaa.gov/science/u-576-searching.html>).

Cultural and Economic Impacts on Sunken WW II Vessels

In WW II's other major naval battlefield, the Pacific Theater, underwater tourists are causing damage to sunken cultural heritage sites related to WW II. As a result, many sites are being vandalized, physically destabilized and looted in the Commonwealth of the Northern Mariana Islands (CNMI) (McKinnon 2015:1). The sunken vessels in Chuuk Lagoon of the Federated States of Micronesia, like many other sites, are not always purposefully vandalized as much as they are the victim of unwitting curiosity on the part of the tourist market that feeds the local economy; a market that is largely focused on tourists that are there for diving and snorkeling. Unfortunately for these sites, it is hard to oversee and mitigate damages due to the inherent visual obscurity of these vessels (McKinnon 2015:4-5, 2). As a result, many sunken Cultural Heritage sites of WW II are in danger of sustained preservation.

The Movement or Theft of Artifacts: In an effort to survey submerged sites in the area, the WW II Maritime Heritage Trail was developed in 2009. Of the twelve sites chosen for the trail, one third of the sites displayed signs of movement or theft (McKinnon 2015:3, 7). Much of the movement within the sites is due to tourists personally rearranging individual objects from one place to another, but there are also signs of theft. Figure 8 shows a Korean shrine with often rearranged bullets on its surface, impacting the site's archaeological context (McKinnon 2015:6-7). Furthermore, there have been numerous occurrences of looting from the sites along the WW II Maritime Heritage Trail. Some of this, however, was a result of the area's scrap metal industry in the 1960s. Though instances of scrapping as recent as 2008 have been documented by the local Historical Preservation Office (HPO), little has been done to retrieve items that have

been looted. Fortunately for future generations, the HPO is invested in the preservation of remaining in situ sites (McKinnon 2015:9).



Figure 8. Korean shrine with continually rearranged bullets on its surface representing alteration of the archaeological and historical context of sites along the WW II Maritime Heritage Trail (McKinnon 2015:7).

Matters such as the movement and theft of historical artifacts can be very complicated when the voice of the community is taken into account. This can be particularly true for areas like the CNMI, whose local economy depends on a tourism industry that is heavily focused on diving and snorkeling near these sites. In a case such as this, the economic needs of the local community is balanced with the risk of damaging and possibly destroying the historical sites that help to sustain the local economy. Furthermore, the heritage associated with these sites is part of the actions of WW II, which was largely a global event. Therefore, this matter of preservation deserves global recognition and debate.

METHODOLOGY

In order to make any claim of intent on the part of US leadership, both the physical records and historical records are paramount in my research. Therefore, this project entails a broad-spectrum and multidisciplinary analysis through various levels of investigation. Since there has been a great amount of public interest in World War II research over the past half century, there is today a plethora of information to be pored over. Though painstakingly and laboriously compiled by researches, the bulk of information on WW II, however, is very often the same chapter and verse information from source to source. The corpus of the common topics on WW II, unfortunately, does not easily provide the precise direction of information needed for this research. As a result, for the topic at hand, I have found only one reliable source that makes available the range and type of information needed to begin this research.

Accessible via the internet, uboat.net provides a vast array of material on the command, operations and technological evolution of U-boats during both World Wars, as well as links to in-site registries that list and address the plight of the Allied merchant vessels that were preyed upon by said German U-boats. U-boat.net, for purposes of this paper, also provides links to books, maps and other outside sources pertaining to World War II's Battle of the Atlantic. The process of scouring uboat.net's extensive multi-authored database of sunken and attacked Allied merchant marine vessels, their convoy registries and their shipping routes, along with the website's database on the German U-boats that were hunting the merchant vessels, was a crucial first step (Helgason 2016a). Taking into consideration that the site lists its extensive references,

though informally, and its major project contributors, I felt it safe to use it as a springboard to my research for this paper.

Upon the discovery of German U-boat captains' attack reports, found in *Axis Submarine Successes of World War Two: German, Italian and Japanese Submarine Successes, 1939 – 1945*, I was able to cross-reference what was found in uboat.net's extensive library (Rohwer 1999:53-74). Furthermore, I was able to add to my list the approximate coordinates and dates of all of the attacked and sunken US merchant marine vessels in the Atlantic Ocean between the start of WW II on September 1, 1939 and the attack on Pearl Harbor on December 7, 1941 (Doyle 2013:180; Griess 1984:21). With this data at hand the process of searching for, investigating and contextualizing records on individual vessels, through outside sources, was hastened.

The next step entailed tracing and expanding upon the lists of sunken vessels and cargo provided by uboat.net and Rohwer's lists for the period. After assembling the vessels needed for this analysis, I was able to begin the process of building an image of Roosevelt's intent for the United States to join or avoid active participation in the Second World War. To create this image of intent, the development of an entirely new multi-layered map was needed (Table 1). This new map was created by first generating a data set in Microsoft Office Excel, whereby seven points of information pertaining to location were entered for each merchant vessel. These points of information include date of attack and/or sinking, the name of the attacking U-boat and position of attack in degrees and minutes, decimal form and location as designated by the German naval charts.

The first step in creating the map was to transfer the data set from Excel to an open source Google Earth Pro. The mapping system preferred the decimal form of the latitude and longitude coordinates over the degrees and minutes form. Therefore, in order to make the

Table 1: Names and locations of US vessels sunk by German U-boats prior to December 7, 1941, as compiled by Author, with location data of *USS Greer* and *USS Salinas* underlined and emboldened to denote that they were located using the German naval grid system (Rohwer 1999:53-74).

List of US Ships Sunk or Damaged in Atlantic Prior to Pearl Harbor									
	A	B	C	D	E	F	G	H	I
1	Name of Vessel	Date of Attack	German Naval Grid Position of Attack	Latitude/ Degrees	Latitude/ Minutes	Longitude/ Degrees	Longitude/ Minutes	Latitude/ Decimal	Longitude/ Decimal
2	<i>SS Robin Moor</i>	5/21/1941	ES 4670	6	10	-25	40	6.16	-25.66
3	<i>USS Greer</i>	9/4/1941	<u>AD 8526</u>	62	33	-27	29	<u>62.55</u>	<u>-27.48</u>
4	<i>USS Kearny</i>	10/17/1941	AL 0146	57	0	-24	0	57	-24
5	<i>SS Lehigh</i>	10/19/1941	ET 2937	8	26	-14	37	8.43	-14.61
6	<i>USS Salinas</i>	10/30/1941	<u>BD 4458</u>	40	51	-37	45	<u>40.85</u>	<u>-37.75</u>
7	<i>USS Reuben James</i>	10/31/1941	AK 9922	51	59	-27	5	51.98	-27.08
8	<i>SS Astral</i>	12/2/1941	CF 7588	35	40	-24	0	35.66	-24
9	<i>SS Sagadahoc</i>	12/3/1941	FU 7887	-21	50	-7	50	-21.83	-7.83

transfer; Dr. David Anderson of UW-LAX assisted me in creating the formulas that were needed to transfer the numerical data points in the Excel program to visual locations within Google Earth Pro. To make the conversions, it was necessary to individually change the functions of the latitude and longitude ranges for degrees and minutes by stating that if a vessel's sunk latitude in degrees is greater than zero, then sunk latitude degrees plus the product of sunk latitude minutes divided by the number 60, and sunk latitude degrees minus the product of sunk latitude minutes divided by the number 60 equals the sunk latitude in the decimal format. Therefore, a sunken vessel's latitude in decimal format is:

$$n = \text{IF} (D4 > 0, D4 + (E4/60), D4 - (E4/60))$$

The same process is done for extrapolating the decimal forms of longitude, and therefore a sunken vessel's longitude in decimal format is:

$$n = \text{IF} (F4 > 0, F4 + (G4/60), F4 - (G4/60))$$

Two vessels, the *USS Salinas* and the *USS Greer*, have their names and positions emboldened and underlined in Table 1. The location data of the *USS Salinas* and *USS Greer* are highlighted under the German naval grid column as well as both latitude decimal and longitude decimal columns. Finally, the latitude decimal and longitude decimal designations for these vessels represent the center point of the particular eight square kilometer square of the German naval grid.

The German Naval Grid

To build the German naval grid, I utilized a website called Naval Grid Calculator (Veness and Krockow 2012). By typing any naval coordinate into the website, I was given a grid plot that I could then transfer to Google Earth Pro. After transferring approximately 100 separate grid coordinates to Google Earth Pro, I was able to create the largest points of the Atlantic Ocean grid (Figure A1). This section consists of large squares and irregular shapes that can be further broken down into smaller square grids. I then had to plot the 99 quadrants within the large Atlantic Ocean grid section of BD in order to try and pinpoint the latitude and longitude decimal form of the *USS Salinas* (Figure A2). After accomplishing this task, I located quadrant BD 44 within quadrant BD, and further plotted the 99 quadrants within BD 44. This allowed me to pinpoint the eight square kilometer quadrant of BD 4458 where the *USS Salinas* is recorded to have been attacked (Figures A3 and A4). I was not able to get the exact latitude and longitude coordinates for the *USS Salinas*, therefore, I plotted the exact center of BD 4458, automatically provided by Veness' Naval Grid Calculator, as the location for the attack. After locating the *USS Salinas*, I repeated the process to locate the latitude and longitude coordinates for the attack on the *USS Greer*.

Figures 9 and 10 represent the two smallest units of the German naval charts that were needed to estimate the locations of the two US vessels, the *USS Salinas* and *USS Greer*, which were not registered with a latitude and longitude designation in the U-boat records. To locate a position within the naval grid system, the U-boat captain took a coordinate like AE 5619, as seen in Figures 9 and 10, and simply worked his way down to smaller and smaller units of measurement, in the same manner that I used to plot the grid.



Figure 9: Image of quadrant AE, consisting of 99 smaller quadrants. (Helgason 2016b)



Figure 10: Quadrant 56 of grid point AE to the left. (Helgason 2016b)

DISCUSSION AND RESULTS

The particular sunken vessels sunken prior to December 7, 1941 that I searched for seem to have not been examined archaeologically, or at very least, are not available to public record. I was unable to find any site reports on the vessels that I discovered for this time period on uboat.net or within Jürgen Rohwer’s list of vessels attacked by the German navy (Rohwer 1999). I was able to ascertain that there were only eight US ships attacked in the Atlantic Ocean prior to the Japanese bombing of Pearl Harbor. These are listed in Table 1.

Of the eight German attacks on US vessels, I found that not all of the US vessels hit were merchant ships, and not all of the attacks resulted in sinkings. Three of the US vessels targeted by U-boats were destroyers (*USS Greer*, *USS Kearny* and *USS Reuben James*), three of the vessels were merchant freighters (The *SS Robin Moor*, the *SS Lehigh* and the *SS Sagadahoc*) and

two of the vessels were tankers (the *USS Salinas* and the *SS Astral*). Of the eight vessels attacked by the German navy, all three merchant freighters were sunk; one of the two tankers, the merchant tanker *SS Astral*, was sunk; and one of the three destroyers, the *USS Reuben James* was sunk. In other words, the US fleet tanker, the *USS Salinas*, and the two destroyers, *USS Greer* and *USS Kearny*, were able to escape their attacks. I believe that this is due to the fact that three of these vessels were military ships, and all of them were part of the convoy system of travel, therefore able to protect themselves from the U-boat attacks that they sustained.

Table 1, and Figures 11 and 12 show that all of the attacks on US vessels occurred within the last eight months of 1941, starting with the sinking of the *SS Robin Moor* on May 21, 1941, and ending with sinking of the *SS Sagadahoc* on December 3, 1941, just three days before the attack on Pearl Harbor. Figure 12 shows the numbers of all US vessels sunk by month in 1941 as a result of the Battle of the Atlantic prior to US entry into the war. Figure 12 also compares those sinkings to the number of total sinkings, only the eight in 1941, from 1939 to 1941.

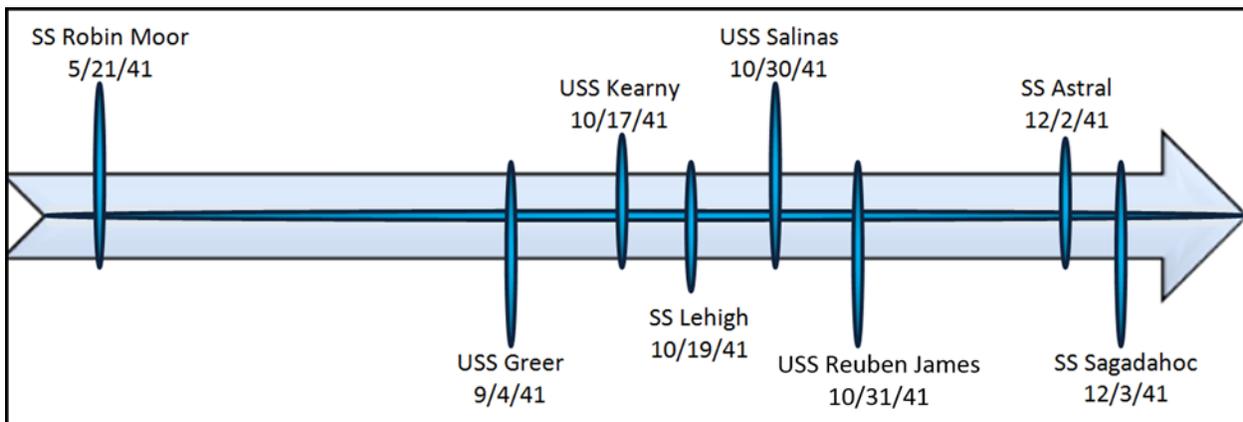


Figure 11: Timeline of all US vessels attacked prior to Pearl Harbor incident, displaying increased frequency of attacks in the fall of 1941 (Rohwer 1999:53-74).

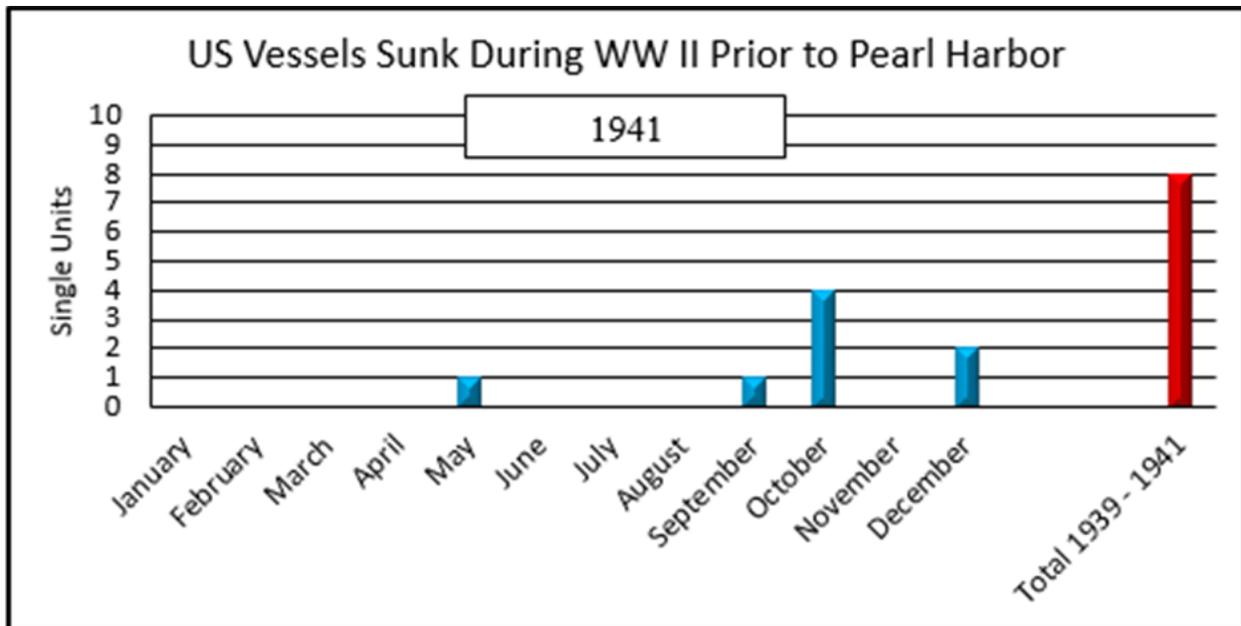


Figure 12. Sunken US vessels in the Atlantic Ocean prior to US entry into WW II (Rohwer 1999:53-74).

Figures 11 and 12 show that the number of US vessels sunk prior to December 7, 1941, during the Battle of the Atlantic, is close to none when compared to the sinkings of the other Allied nations in the same time period (Figure 13). If FDR was, in fact, attempting to incite a national sense of anger and retribution toward Germany by putting US vessels in harm's way, the above data does not seem to reflect that.

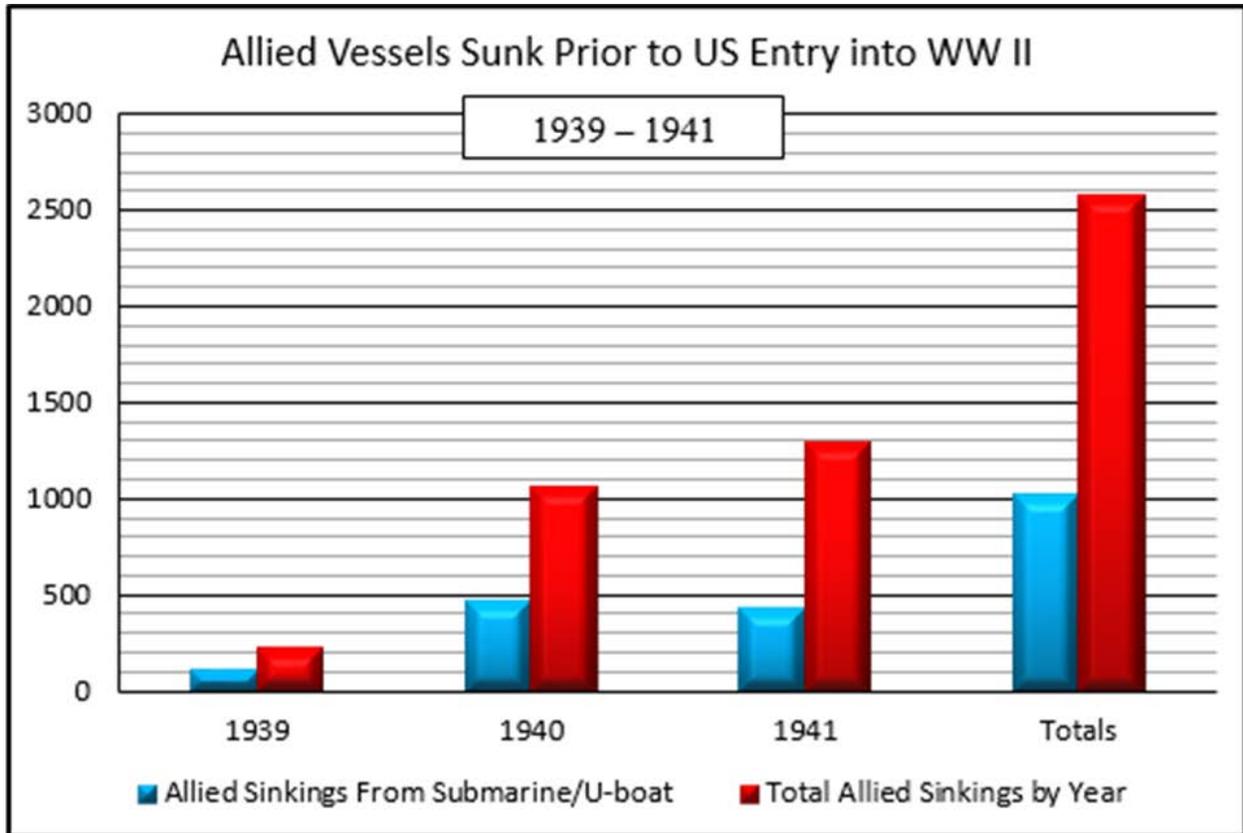


Figure 13. Sunken Allied vessels in the Atlantic Ocean between 1939 and 1941 (Doyle 2013:184-5).

As stated in the beginning of this analysis (Figure 2), one would expect to see many more than eight US vessels being attacked prior to the United States entering the war. However, we would also expect to see a potentially large clustering of US vessels, or at least a small clustering of ships, in a higher magnitude than the surrounding regions, and in a known area of high U-boat patrols. By populating the region of the Atlantic Ocean specified in Figure 4, Figure 14 shows that four of the eight attacks on US vessels were, in fact, where this report initially expected a clustering to occur. Though the amount of attacks is less than initially expected, when Figures 11 and 12 are taken into context with Figure 14, it is clear that more US vessels were being attacked within the area of expectation, and at a higher frequency than any previous point, within the latter half of 1941. However, the data do not fully support the hypothesis that FDR was attempting to incite public outrage by putting US vessels in harm's way.

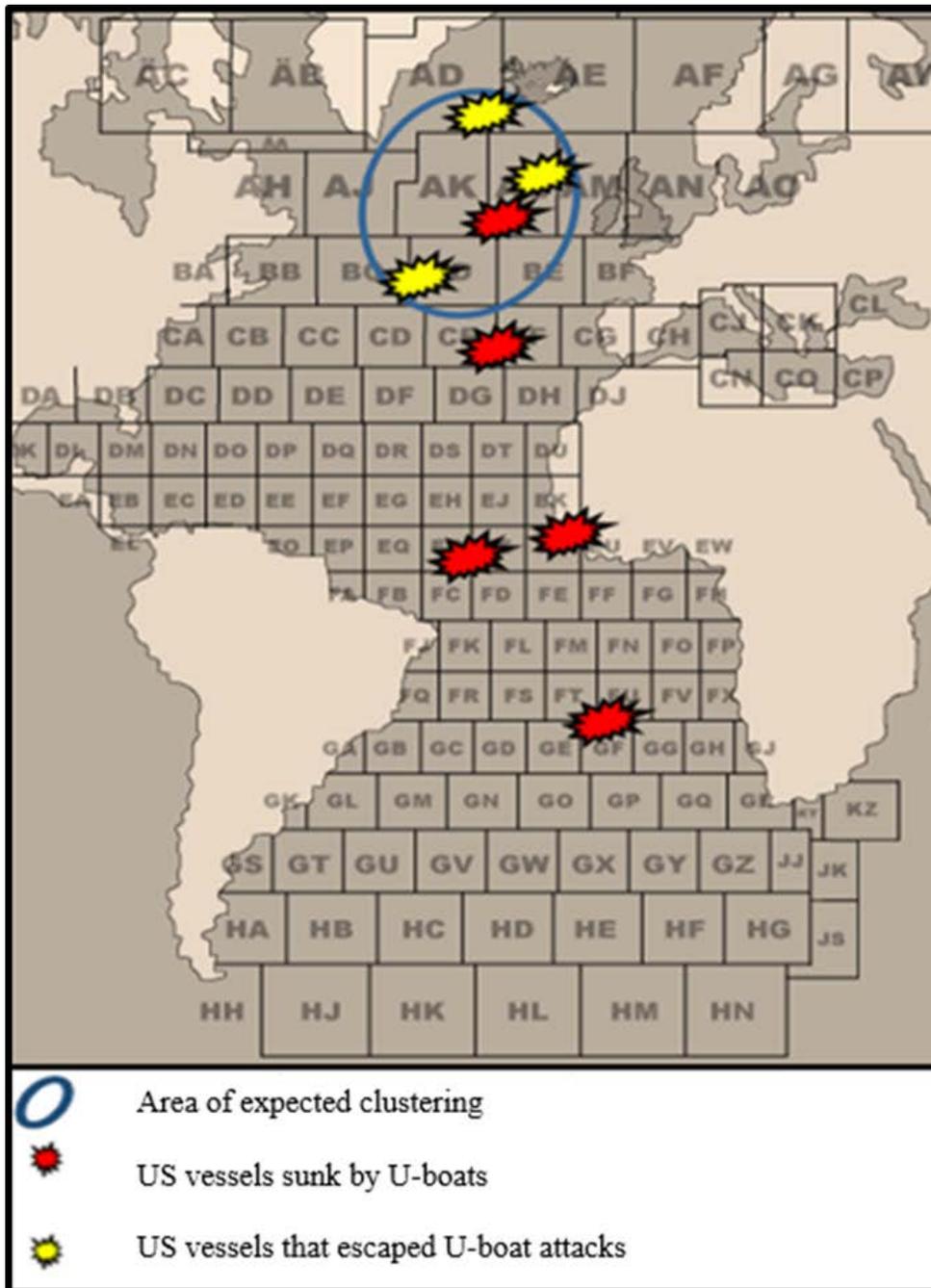


Figure 14. Graphic of the locations of U-boat attacks on US vessels as modified by author (Helgason 2016b; Rohwer 1999:53-74).

Figure 15 shows the main maritime supply route that the United States utilized to help support Britain's efforts against Germany. As seen in Figure 16, the route travels directly through the German blockade zone of Britain. The image shows the route traveling within a series of overlapping arches that represent the maximum range of Allied aerial recognizance and support planes that could alert vessels of U-boats in the region. Both are indicated in the adapted key, which I adapted from the original in order to make the image more legible.

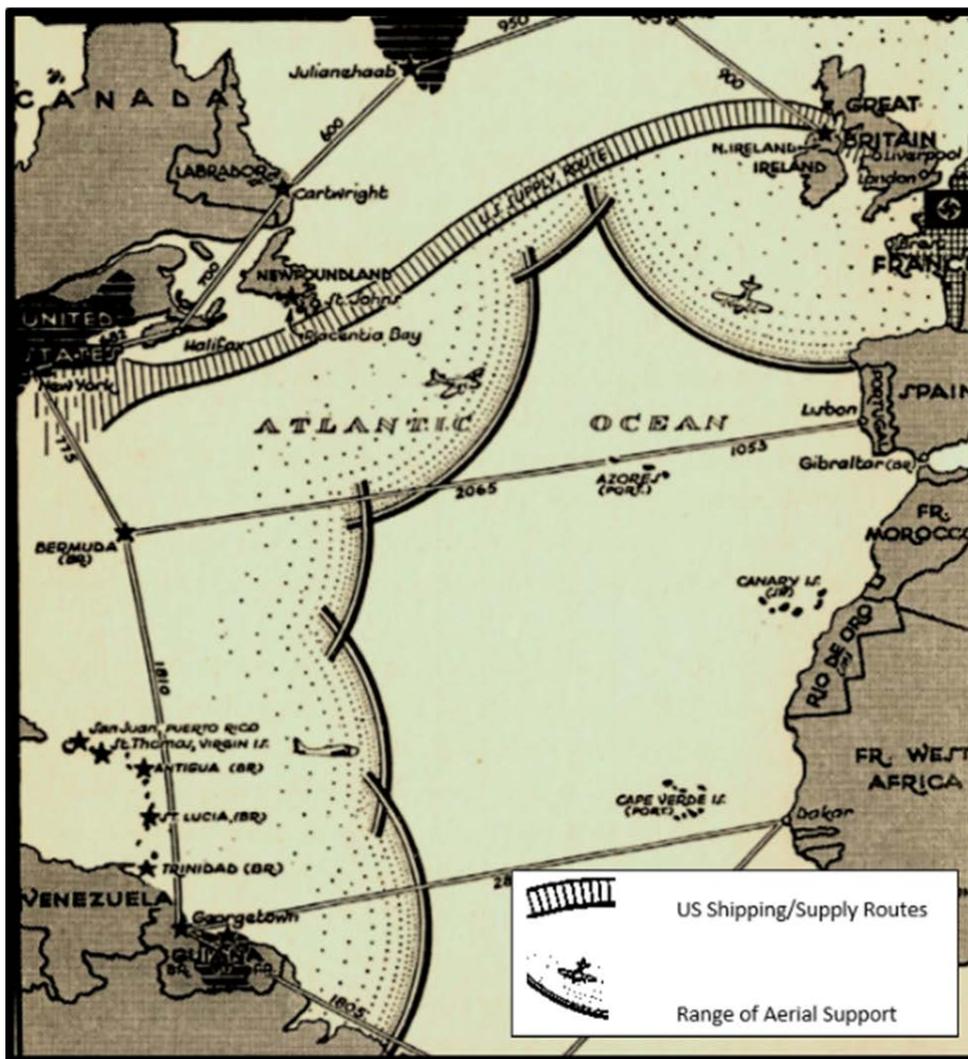


Figure 15. US supply lines, and range of aerial support 1939 – 41 (adapted from Brown and Herlin 1942:108).

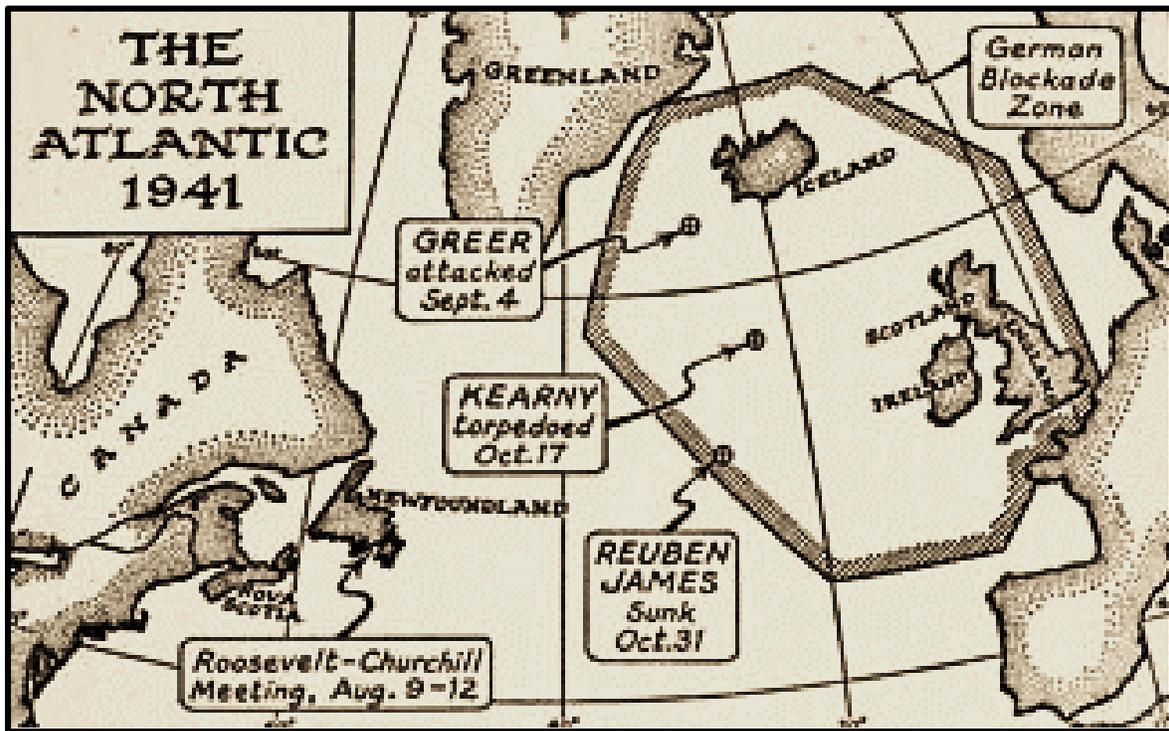


Figure 16: Graphic of the 1941 German blockade in the North Atlantic at the time of attacks on US vessels (Bailey and Ryan 1979:170).

Finally, by comparing the US supply lines and aerial support boundaries from Figure 15 to the positions that US vessels were attacked in Figure 14, we can see that the attacked ships were within aerial support range. This implies that FDR was trying to avoid endangering US lives, as well. However, I feel that the evidence is rather clear in showing that FDR was putting US vessels in harm's way in the latter half of 1941. The appearance of conflicting evidence in Figure 17 may merely show that FDR was goading a preemptive strike from the German navy by wantonly sending US vessels across the blockade zone (Figure 16). Further, I feel that this was merely the early stages of the next step after convincing the US public on the benefits of helping Britain through measures like the *Lend-Lease Act*. As these US vessels were being attacked, they were being publicized in the media, and reported by FDR, himself, in his weekly Fireside

Chats. These measures helped to push the people of the United States toward a less pro neutral sentiment.

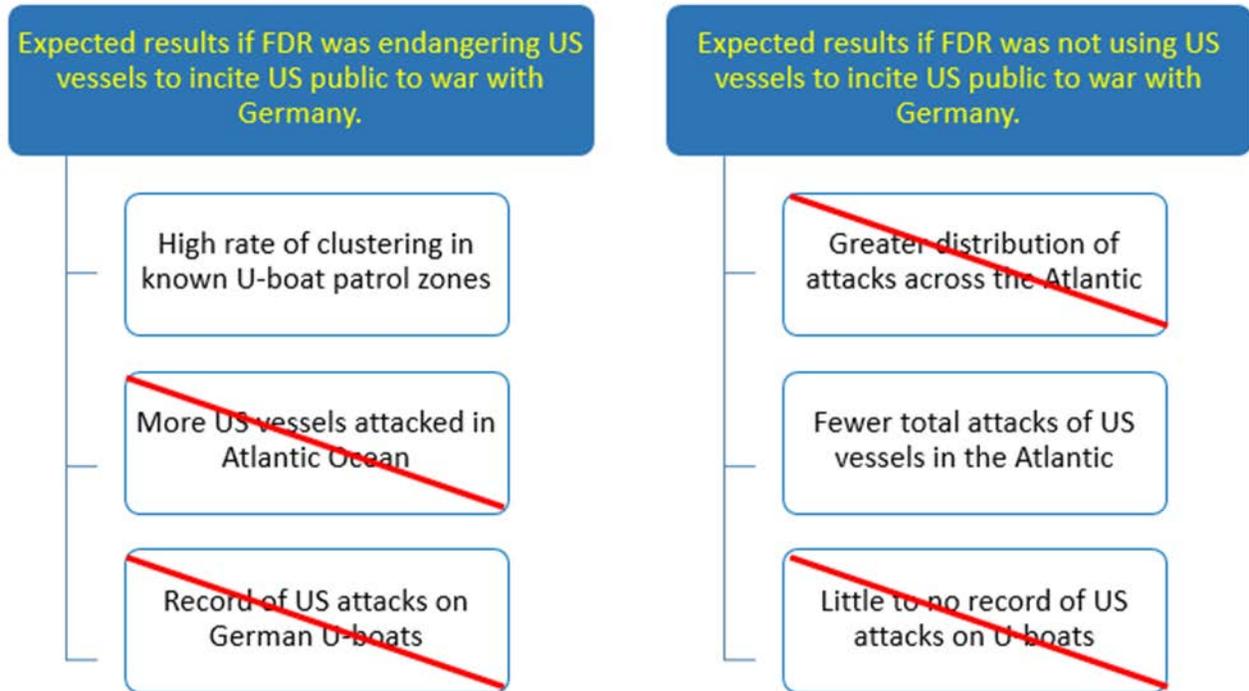


Figure 17: Expected results of study for, both, FDR seeking and avoiding conflict during World War II checked against results of this paper.

CONCLUSIONS

At the start of this analysis on whether or not President FDR was placing US Navy and merchant mariners in harm's way to elicit a US call to arms, I was sure that I would find more physical data and historical records of German attacks on US vessels. I instead found that there was record of only eight attacks prior to the US entry into WW II, and that the archaeological record

of these particular vessels either does not yet exist, or is inaccessible. However, by researching the historic records, I was able to locate the approximate sites of attacks and sinkings of the eight vessels, and plot their positions onto a new Google Earth map. In this way, I was able to show that US vessels were being attacked within a particular region of the Atlantic Ocean and within a shorter timeframe than any other point, prior to US entry into WW II, during the fall season of 1941. Furthermore, these attacks came after FDR announced Acts like the *Lend-Lease Act* and the *Destroyers for Bases* deal, as well as his good neighbor policy to the US public. I show that, as a result of FDR's international policies and domestic shrewdness, the US public was slowly coaxed toward accepting war in Europe. By placing US vessels in harm's way at the right moment of national sentiment, the US public was further desensitized to the idea of war. I hope that the information that I gathered and the imagery that have created, and will further build upon, will be utilized by others in the field to continue research in a more archaeo-political line of research of humanities recent past.

Lacking the site reports of the particular vessels of interest, I provided two case studies that looked at how unseen potential heritage sites can be located using modern technology in conjunction with the historical record. I further showed that the act of locating visually obscure potential heritage sites has financial, cultural and emotional benefits to the local community and humanity as a whole by presenting the case study of the CNMI. However, the benefits may be detrimental to the potential heritage sites, which are routinely looted, vandalized or moved, thereby, forever altering the cultural integrity that draws people to the sites.

Though limited by my initial data, I feel that my findings did establish a pattern of intent by FDR to enter WW II, however, I intend to further plot the sunken vessels of WW II in an attempt to contribute to the field, and to better understand, prove or disprove the actions of our

recent past. In order to properly portray these actions, though, I believe that there needs to be more transparency between agencies and the citizens that they work for, both national and international. In this way, proper methods of cultural resource management can be established while allowing for further academic survey of international heritage.

APPENDIX

THE GERMAN NAVAL GRID

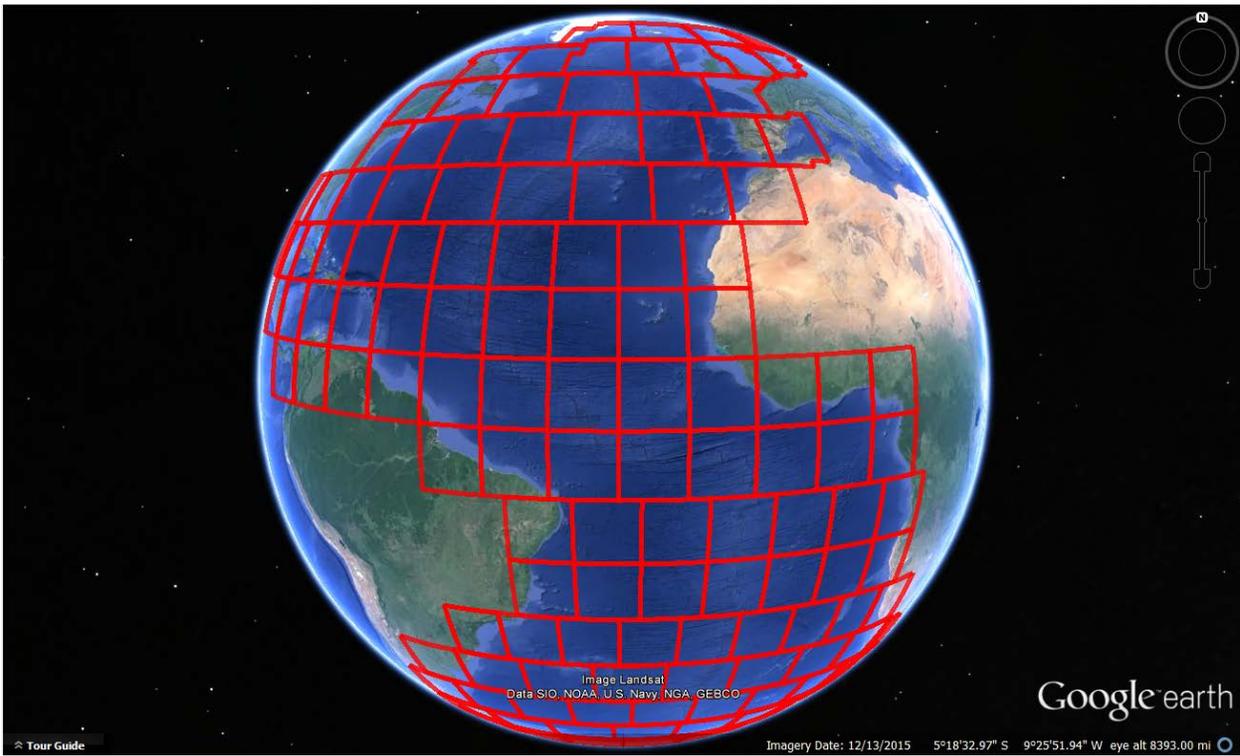


Figure A1. Image of German naval grid in the Atlantic Ocean imposed onto Google Earth (Google Earth Pro 2016).

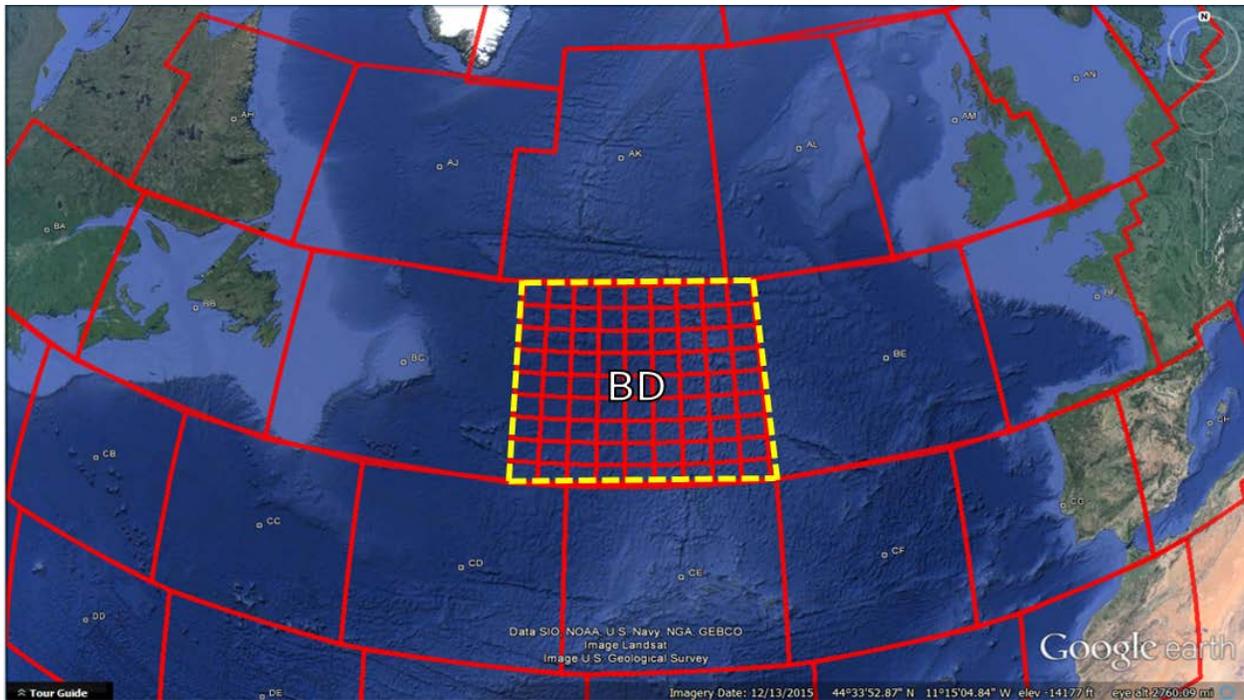


Figure A2. Close up of grid BD in the middle of the North Atlantic Ocean, enabling a view of its 99 quadrants (Google Earth Pro 2016).

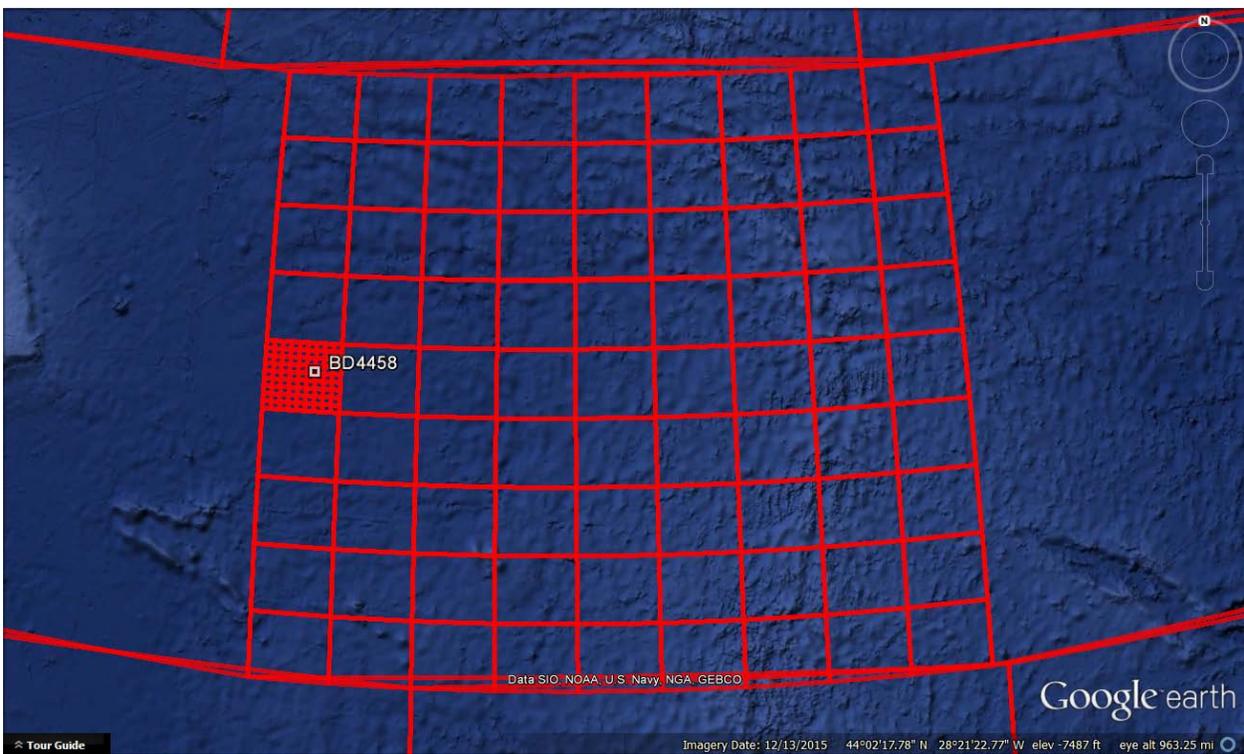


Figure A3. Higher resolution close up of grid BD enabling view of its 99 quadrants, with BD 44 populated further with its sub-quadrants (Google Earth Pro 2016).

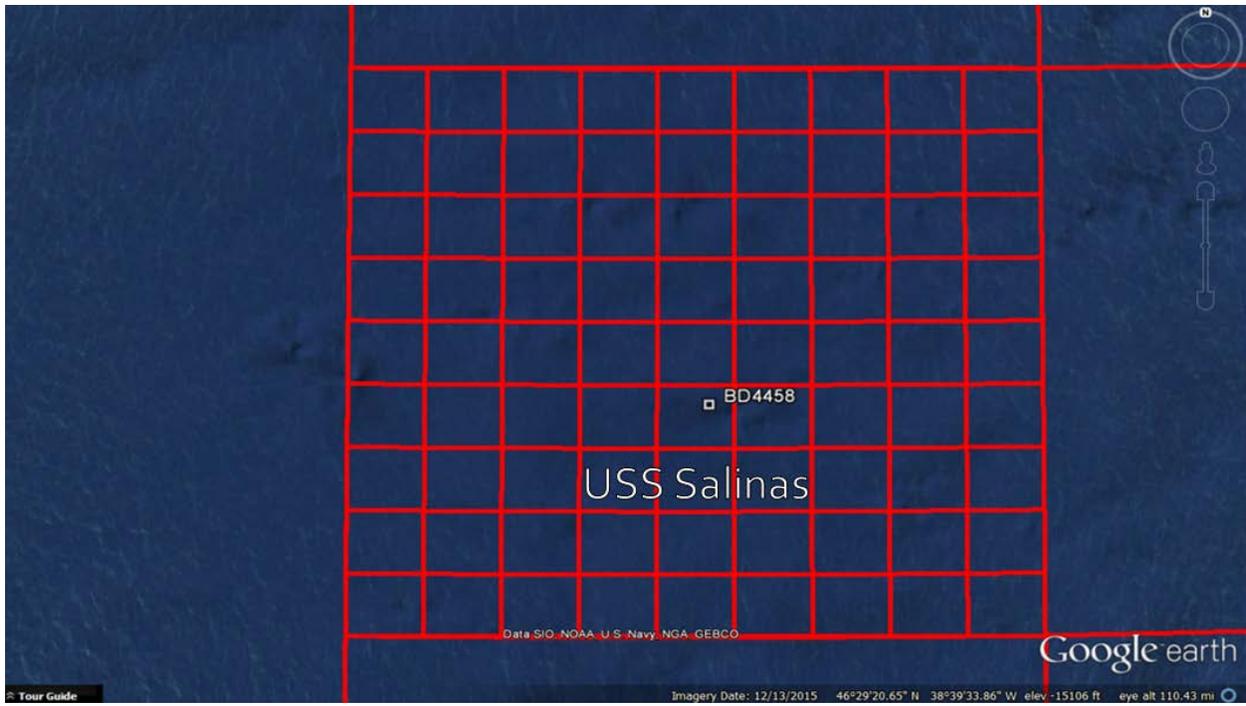


Figure A4. Higher resolution close up of grid BD 44 enabling view of its 99 sub-quadrants, and the specific sub-quadrant, BD 4458, where the *USS Salinas* was attacked (Google Earth Pro 2016).

BIBLIOGRAPHY

Bailey, Thomas and Paul B. Ryan

1979 *Hitler Vs Roosevelt: The Undeclared Naval War*. Collier MacMillan Publishers, New York.

Bevans, Charles I. (editor)

1974 *Treaties and Other International Agreements of the United States of America 1776 – 1949*, Vol. XII. pp: 551-4. Department of State, Washington D.C.

Brown, Francis with Emil Herlin

1942 *The War in Maps: An Atlas of the New York Times Maps*. Oxford University Press, New York.

Cadw, with the Welsh Archaeological Trusts

2009 The Battle of the Atlantic in *Military Sites of the Twentieth Century*. Electronic document,
http://cadw.gov.wales/docs/cadw/publications/Caring_for_Military_Sites_EN.pdf,
accessed April 1, 2016. Cadw, Cardiff.

Chicago Daily Tribune

1941 F.D.R.'s War Plans. Electronic document,
<http://archives.chicagotribune.com/1941/12/04/page/1/article/f-d-r-s-war-plans>, accessed
April 21, 2016.

Doyle, Peter

2013 *World War II in Numbers: An Infographic Guide to the Conflict, its Conduct and its Casualties*. Firefly Books, Buffalo, New York.

Goralski, Robert

1981 *World War II Almanac: 1931 – 1945: A Political and Military Record*. G. P. Putnam and Sons, New York.

Google Earth Pro

2016 Google Earth Pro. Electronic document, <http://earth.google.com>, accessed February 4, 2016.

Griess, Thomas E. (editor)

1984 *The Second World War: Europe and the Mediterranean*. The West Point Military History Series Vol. 1. Avery Publishing Group, Wayne, New Jersey.

Hacken, Richard and Jane Plotke

2001 Peace Treaty of Versailles. Electronic document,
<http://net.lib.byu.edu/~rdh7/wwi/versa/versa7.html>, accessed March 10, 2016.

Helgason, Gudmundur (editor)

2016a About u-boat.net. Electronic document, <http://uboat.net/>, accessed February 4, 2016.

2016b The Grid System. Electronic document, <http://www.uboat.net/maps/grid.html>, accessed February 4, 2016.

Kennedy, David M. (editor)

2007 *The Library of Congress World War II Companion*. Simon and Schuster, New York.

Langer, William L. and S. Everett Gleason

1953 *The Undeclared War: 1940 – 1941*. Harper and Brothers, New York.

Meacham, Jon

2004 *Franklin and Winston: An Intimate Portrait of an Epic Friendship*. Random House Trade Paperbacks, New York. National Oceanic & Atmospheric Administration

McKinnon, Jennifer F.

2015 *Memorialization, Graffiti and Artifact Movement: A Case Study of Cultural Impacts on WW II Underwater Cultural Heritage in the Commonwealth of the Northern Mariana Islands*. Springer Science + Business Media, New York.

MNMS (Monitor National Marine Sanctuary)

2014 Searching for the Battlefield-Archaeological Methodology. Electronic document,
<http://monitor.noaa.gov/science/u-576.html>, accessed April 4, 2016.

Persico, Joseph Edward

2001 *Roosevelt's Secret War: FDR and World War II Espionage*. Random House Trade Paperbacks, New York.

Rohwer, Jürgen

1999 *Axis Submarine Successes of World War Two: German, Italian and Japanese Submarine Successes, 1939 – 1945*. Greenhill Books, London, Naval Institute Press, Annapolis, Maryland.

Stettinius, Edward R. Jr.

1944 *Lend-Lease: Weapon for Victory*. The Macmillan Company, New York.

USHMM (United States Holocaust Memorial Museum)

2016 *World War I: Treaties and Reparations*. Electronic document,
<https://www.ushmm.org/wlc/en/article.php?ModuleId=10007428>, accessed March 2, 2016.

Veness, Chris and Jan Krockow
2012 Naval Grid Calculator. Electronic document, <http://www.navalgrid.com/find/square/bf>,
accessed March 18, 2016.

