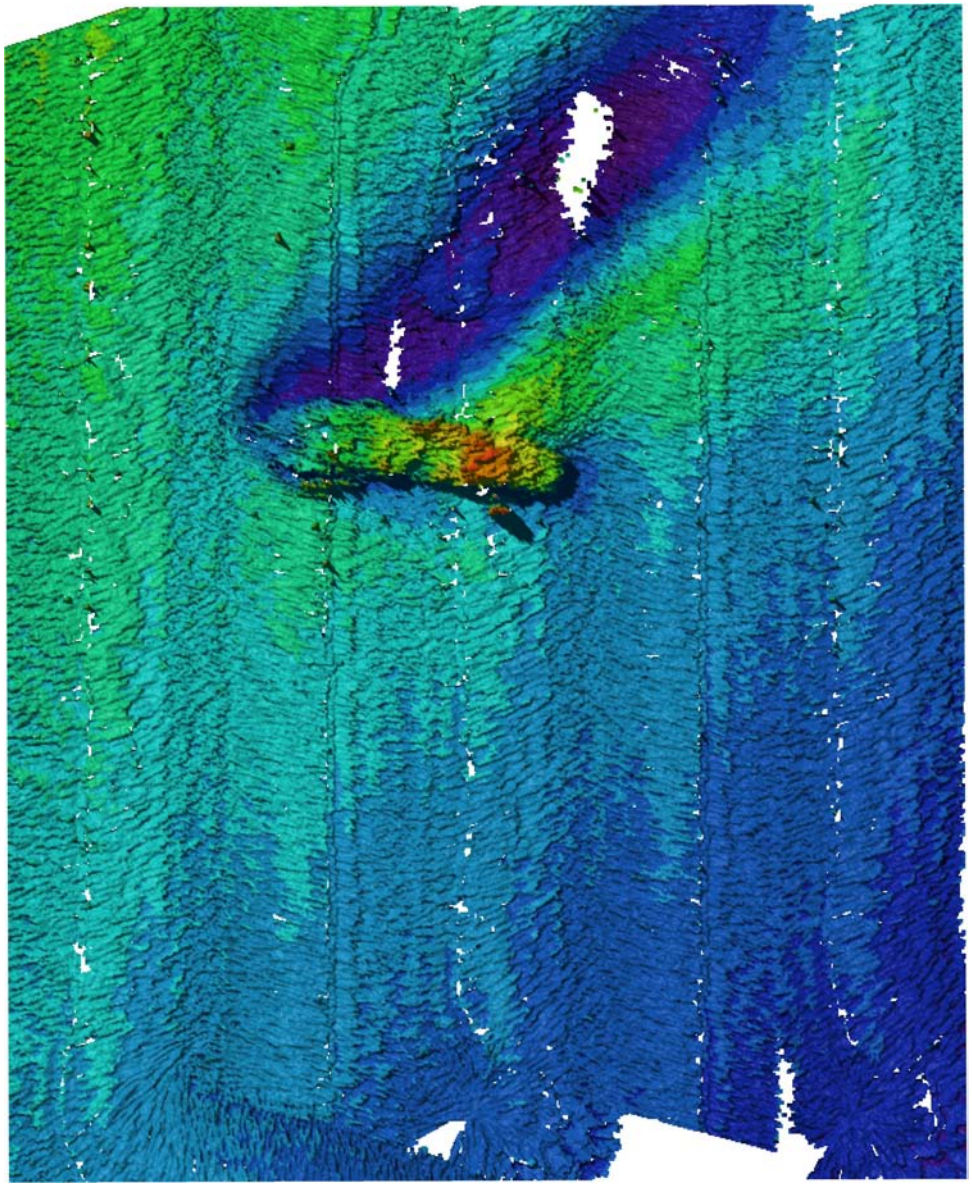
2012 Battle of the Atlantic Research Design:

Cataloging North Carolina's WWII Coastal Heritage



Prepared By:

John Bright: NPS Submerged Resources Center

Dr. Nathan Richards: UNC Coastal Studies Institute

Joseph Hoyt: NOAA Office of National Marine Sanctuaries

John Wagner: NOAA Office of National Marine Sanctuaries

INTRODUCTION

Since 2008 NOAA's *Monitor* National Marine Sanctuary (MNMS), in conjunction with East Carolina University, and the Bureau of Ocean Energy Management has lead archaeological, biological, and historical surveys of World War Two heritage resources off the North Carolina coast. This effort was undertaken to determine baseline preservation values, initiate and support ongoing historical and archaeological research in North Carolina, and to evaluate the significance of this collection in consideration of expansion in the Marine Sanctuary off North Carolina. Previous work included diver surveys and mapping to generate site-plans and photomosaics, as well as remote sensing surveys using multibeam and ROV technology.

The genesis for the project came after any outcry from the local diving community regarding looting on German World War Two U-boat, *U-701*. For nearly fifteen years the site was known to only a small group of divers who purposefully left the wreck undisturbed. In 2004, however, the site became known to the broader diving community and was privileged with the respect of the local diving community, recognizing the resource significant *vis-a-vis* the lack of disturbance upon the site, especially in relation to the two other frequented U-boat sites in North Carolina: *U-85* and *U-352*. Unfortunately, an unknown group of individuals began to illegally recover artifacts off the site. This outraged the diving community, which had hoped to establish a preserve around the site (Allegood 2004; Kozak 2004).

In early 2008, MNMS Superintendent David Alberg received reports of another group planning to illegally recover more material from the site. This information demonstrated the need for a systematic approach to collect baseline data on the site. Subsequent requests for action from Thomas Prőpstl, Consul General at the German Embassy in Washington, D.C., further increased the necessity of carrying out an investigation to proper archaeological standards.

In addition to these critical cultural and political factors, natural forces also justified this project. The site of *U-701*, located in Diamond Shoals off Cape Hatteras, is in an extremely dynamic environment. It is believed, prior to Hurricane Isabel in 2003, the majority of the site was buried under sand. In 2008, however, the site was reported as

uncovered to an extent rarely seen, thus offering a rare opportunity for this type of investigation.

Therefore during the summer of 2008, NOAA's Office of National Marine Sanctuaries (ONMS) in collaboration with East Carolina University (ECU), the National Park Service (NPS), Minerals Management Service (MMS), UNC's Coastal Studies Institute (CSI), and the State of North Carolina initiated a series of underwater archaeological field expeditions to examine the remains of vessels lost during the Battle of the Atlantic in the Second World War. The first of these expeditions was aimed at concerns surround site formation of German U-boats off North Carolina. In particular, the sites investigated were *U-85, U-352*, and *U-701*, sunk by US forces in engagements that proved to be very important, but largely forgotten parts of American history. This was the closest European theatre of war to the continental United States and one of the only places in the world where one can visit remains of both Axis and Allied vessels within recreational diving limits. These sites are recognized as valuable cultural, historical, and economic resources for the United States and the state of North Carolina (Farb 1992;Casserley et al. 2008).

In 2009, NOAA ONMS and its partners returned to continue research on World War Two casualties. The focus of the 2009 expedition was on allied military losses. A remote sensing survey aboard NOAA ship *Nancy Foster* re-located and positively identified the remains of *YP-389*, a US Navy patrol craft sunk by *U-701*. The site rested in deep water and survey utilized a Remotely Operated Vehicle (ROV) (Hoyt 2009). Additionally, 2009 fieldwork archaeologically documented the site of HMT *Bedfordshire*, a British anti-submarine trawler, sunk by *U-558* off Cape Lookout, North Carolina. Also during the 2009 field season, with the support of NOAA, researchers at East Carolina University were awarded seed funding by ECU's Coastal Maritime Council for the proposal *The Battle of the Atlantic: an Archaeological Site Management and Environmental Risk Assessment Proposal* (Richards and Allen 2009). This award supported the research of John Wagner, and culminated in an MA thesis entitled *Waves of Carnage: A Historical, Archaeological, and Geographical Study of the Battle of the Atlantic in North Carolina Waters* (Wagner 2010). Wagner input archaeological and historical data into a Geographic Information System (GIS) and performed spatial

analyses to delineate the battlefield area and centers of activity therein. The dataset collected by Wagner serves as the foundation upon which this present study builds.

A third year of survey in 2010 aimed at cataloging site significance and identifying degrading impacts from both environmental and cultural factors upon a collection of World War Two merchant vessels: *Empire Gem, E.M. Clark, Manuela, Malchace, Dixie Arrow, City of Atlanta* and *British Splendour,* as well as the US Navy Tug *Keshena* lost off North Carolina (Hoyt 2010). From this project it was hoped to obtain combined historical and archaeological assessments of the resources observed. This preliminary investigation established a baseline for future monitoring of the sites as cultural and economic resources and a foundation for future research. Also during 2010, the research undertaken by Richards, Allen, and Wagner led to the preparation of a proposal to the American Battlefield Protection Program (ABPP-National Park Service) which proposed to extend Wagner's historical research to greater archaeological scrutiny via a theoretically explicit battlefield analysis of the North Carolina segment of the Battle of the Atlantic. This funding, awarded in fall 2010, supported two MA thesis projects within ECU, John Bright's *Stalking the Gray Wolf: A KOCOA Terrain Analysis of the Battle of the Atlantic off the North Carolina Coast* (Bright 2011) and an as yet unnamed project focusing upon visualization of naval battlefields by Stephen Sanchagrin (ECU and RENCI). Combined with funding sources oriented towards management goals corresponding to the 2008-2010 expeditions, a fourth expedition conducted in 2011.

The 2011, the expedition was composed of four separate stages focused on the discovery, characterization, and documentation of submerged cultural resources from World War Two, in particular 1942-1944. Funding sources for this research came from:

- *Phase 1:* ABPP (NPS); the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE); and the Office of National Marine Sanctuaries(ONMS).
- *Phase 2*: CIOERT, NOAA OE; a grant from the Local Programming Development Initiative (GovEd TV, Dare County, NC); and ONMS.
- *Phase 3:* NOAA ONMS; ONMS Maritime Heritage Program (MHP).
- *Phase 4:* NOAA OE; NOAA ONMS; and CIOERT.

These funds were awarded to East Carolina University, the UNC-Coastal Studies Institute, and the *Monitor* National Marine Sanctuary. Additional significant in-kind support has come from:

- Program in Maritime Studies, East Carolina University
- The University of North Carolina-Coastal Studies Institute
- The Renaissance Computing Institute
- National Parks Service: Submerged Resource Center

The primary focus of the 2011 expedition was the KS-520 convoy attack off North Carolina. Historical and archaeological research on the events that unfolded around this convoy offer the potential to study adaptation and tactical behavior displayed by the American Navy in response to the German U-boat threat, a shoehorn to begin defining the Battle of the Atlantic from a behavioral perspective. Additionally, this convoy may be considered the iconic interaction of combatants off the North Carolina coast with structures and debris from both sides believed to still lie on the seabed in immediate geospatial and temporal association. This expedition offered the opportunity to reassess its history, as well as analyze the archaeological record regarding the progression of events during the conflict, and the relationship of human interactions (tactics and responses) with natural parameters within the landscape (currents, water temperature, bottom topography, water depth, etc…).

The historic positions of several participants in this engagement are well known; however, none of these vessels have been located or positively identified. The intent of the 2011 expedition was to employ a wide area survey to search for these vessels. The discovery of remains of Nicaraguan Tanker *Bluefields* and the German *U-576* would add a great deal to the cultural landscape of North Carolina and lend a better understanding of the Battle of the Atlantic through the adaptation and application of battlefield analysis techniques.

This project followed the "multi scalar explanatory approach" endorsed by Conlin and Russell (2011:41-42) as well as the procedures outlined by Lowe (2000) and Babits et al. (2010:5) by utilizing the survey methods pioneered for analysis of terrestrial battlefield sites concerned with understanding the relationship of military theory and

landscape features to the actions of opposing forces. This included a KOCOA analysis (an abbreviation of Key terrain, Observation and fields of fire, Cover and concealment, Obstacles, and Avenues of approach/retreat) (Lawhon 2002:36) that has become the preferred analytical technique of the American Battlefield Protection Program (ABPP).

The 2011 field season was successful in covering a large area of seabed with low resolution imagery. The detail was such that 47 anomalies were identified, but could not be characterized. It is the intent to return to the 2011 target area to conduct higher resolution surveys of the anomalies in an attempt to identify targets. As such the approach and methodology for phase II of 2011 will be effectively redeployed.

Additionally, the 2012 survey will endeavor to collect baseline data on additional WWII merchant vessels of the coast of North Carolina. Several sites are known to be located off the coast but NOAA and partners have little or no actual data on the sites. The focus will be on site characterization, predominantly via photo and video, as well as traditional survey techniques outlined in the methodology section. The target for these in water assessments will be to gain as much data on each site in order to verify identity where in question, and to determine site integrity based on National Historic Preservation Standards for Register eligibility.

HISTORICAL BACKGROUND

The Battle of the Atlantic began mere hours after Britain declared war on Germany in September of 1939, and would last until Germany's surrender in May, 1945. This extensive naval engagement between Allied, Axis, and neutral forces constituted the longest single operation of the Second World War, and was "the longest, largest, and most complex naval battle in history" (Syrett 1994:ix). Civilians, sailors, soldiers, marines, and coast guardsman engaged in combat, and in turn gave their lives, in a dire struggle for seapower in the Atlantic. Retired Royal Navy escort group commander, Donald MacIntyre (1961:11), wrote of the battle's importance to the entire Allied war effort

> [as] an aspect of naval warfare, which on account if its often hum-drum nature is apt to be looked upon as a side-show, a back-water of the main stream of naval operations, yet which is in fact the

> whole purpose of seapower and in which an island power must either decisively win or be driven to abject surrender.

He could not have been more correct. The flow of war materiel into Great Britain via the Atlantic was the lifeblood of the Allied war effort against Germany, and Germany nearly severed it. Though the Battle of the Atlantic was not witness to spectacular fleet engagements such as those fought in the Pacific, it was nonetheless of supreme strategic importance. At stake was the last bastion of resistance in Europe to Hitler's dreadful war machine.

Following America's entry into the Second World War, German U-boat raiders attacked merchant shipping off the United States' east coast with astonishing success. What ensued came to be known as the "American turkey shoot," with nearly 200 merchant vessels sunk between January and April of 1942 (Cheatham 1990:11). Inaugurated by Germany's initial offensive, code named "Operation Paukenschlag," this "Atlantic Pearl Harbor" was the prelude to nearly five months of unchecked German commerce raiding (Gannon 1990:xvii-xviii) on the east coast. Slowly, though, combined Allied naval forces resisted, and ultimately forced withdrawal of German forces haunting American waters. Hard fought, yet far from over by the end of 1942, the Battle of the Atlantic all but left the eastern shores of the United States.

What follows is a historical account of one engagement during the Battle of the Atlantic: the KS-520 convoy battle off the North Carolina coast. A great deal of writing has already dealt with many aspects of the battle (Morison 1947;; Macintyre 1961, 1971; Hughes and Costello 1977; Hoyt 1978, 1984; Gibson 1986; Hoyt 1987; Gannon 1990; Syrett 1994; Blair 1996; Kaplan and Curry 1997; Kemp 1997; Gannon 1998; Kaplan and Curry 1998; Wiggins 1999; Blair 2000; Hague 2000; Miller 2000; Showell 2002; Brennecke 2003; Ireland 2003; Westwood 2003; Blake 2006; Showell 2006; White 2006; Brown 2007; Williamson 2010); these sources discuss the battle in its totality, its tactics and technology, regional histories, or personal accounts. Unlike previous studies, however, the present narrative seeks to connect the larger strategic objectives and operations of the Battle of the Atlantic to the battlefield area off the North Carolina coast. In particular, in so much as these provide the context to understand the often skimmed

over KS-520 convoy battle. Though only a single naval action, KS-520, in fact, marks a shift in strategic initiative off America's eastern seaboard. The significance of this shift would reverberate throughout the entire Atlantic. Once the Allies drove German U-boats from American waters, German hopes of dominating Atlantic seapower were lost.

The importance of the Battle of the Atlantic, though not well known to the public, has been extensively studied by historians, and is generally viewed as keystone to allied victory in Europe. For example, naval historian Michael A. Palmer (2007:259) has noted, "without victory in the battle of the Atlantic, there never would have been a second front in Europe," and "had the Allies failed at sea, the impact along the Russian front would have been enormous." In other words, the conflict precipitated by U-boat predations on Atlantic commerce had massive potential global implications for eventual Allied victory. Furthermore, this extensive naval engagement between Allied, Axis, and neutral forces constituted the longest single operation of the Second World War.

Project Dates and Participants

Location: NOAA Vessel R-8501 will operate out of Beaufort , NC.

Dates:

STAGE ONE

July 9: Arrival and Staging (potential evening departure for survey area)

July 10-12: Operational in Survey Area

July 13: Reprovisioning/Service day

July 14-17: Operational in Survey Area

July 18: Breakdown and Departure

STAGE TWO

July 19: Arrival and Staging

July 20 – August 3: Dive Operations in Survey Area (weather dependent)

August 4: Project end/departure SRVx disembark in Norfolk, Va

Participants:

STAGE ONE:

Joseph Hoyt (NOAA)– Co-PI

John Wagner (NOAA) – Co-PI

Frank Cantelas (NOAA-OER) /Vitad Pradith (NOAA-OCS) - Alternating

John Kloske (SRI) – AUV Survey Director

Steve Untiedt (SRI) – AUV Tech

Charlie Cullins (SRI) – AUV Tech

BOEM –TBD

John McCord (UNC-CSI)

Pasquale DeRosa (CPC) – Captain

CPC Vessel Crew – TBD

CPC Vessel Crew – TBD

STAGE TWO

Joseph Hoyt (NOAA)- PI –RB Diver

Nathan Richards (UNC-CSI) – Co-PI

John McCord (UNC-CSI)

Dave Sybert (UNC-CSI)

Tane Casserley/Russ Green (NOAA) (alternating) – RB Divers

Hans Van Tilburg (NOAA) – RB Diver

NPS Diver – TBD

BOEM – TBD

Pasquale DeRosa (CPC) – Captain

CPC Vessel Crew – TBD

CPC Vessel Crew – TBD

METHODOLOGY

Historical Methodology

Research regarding the Battle of the Atlantic is both extensive and varied. Numerous works have focused on the general conflict (Morison 1947; Macintyre 1961, 1971; Hughes and Costello 1977; Gannon 1990; Howarth and Law 1994; Syrett 1994; Gannon 1998; Ireland 2003; Williams 2003; White 2006) while others the development and operations of German and allied craft (Frank 1955; Willoughby 1957; Scheina 1982; Hoyt 1984, 1987; Blair 1996; Grove 1997; Kaplan and Currie 1997; Kemp 1997; Kaplan and Currie 1998; Wiggins 1999; Blair 2000; Hague 2000; Miller 2000; Showell 2002; Westwood 2003; Showell 2006; Watson 2006; Brown 2007). Several studies dealt specifically with the eastern seaboard and the North Carolina Coast (Stick 1952; Hoyt 1978; Gentile 1989; Hickam 1989; Cheatham 1990; Gannon 1990). Additionally, due to the adjacency of the Gulf Stream, the concentration of historically significant and recreationally accessible wrecks has attracted shipwreck divers to the area since the 1960s. As a result, numerous popular dive guides were written for divers in North Carolina, often containing thorough research into individual vessel histories and positional information (Farb 1992; Gentile 1992, 1993, 2006; Bunch 2003; Galecki 2005).

Several historical archives will be accessed for primary documents during this project. National Archives and Records Administration (NARA) maintains multiple repositories with documents relating to the Battle of the Atlantic. The National Archives Building, in downtown Washington, D.C., houses records of the United States Coast Guard in Record Group (RG) 26 of interest are vessel logs, and operational reports. The National Archives II in College Park, Maryland, houses analogous records for the United States Navy. These holdings include:

The Bureau of Ships

Naval Personnel Records (including deck logs)

Chief of Naval Operations

The Bureau of Ordnance

Naval Districts and Shore Installations

Furthermore, Archives II houses still photography and cartographic records for the United States Navy and Coast Guard, including maps, and photographs of ships, installations, and miscellaneous operations. The National Archives Mid-Atlantic Region facility in Philadelphia contains records from the Philadelphia and Norfolk Navy Yards, in addition to records from the Fifth Naval District, as part of its holdings within RG 181. Of particular interest would be merchant ship files regarding the manning and provisioning of armed merchant vessels.

Additionally, The Mariners' Museum Library holds and extensive collection of photographic material, which will be consulted, and the library and archives at the Merchant Marine Academy in Kings Point, New York is also believed to contain a variety of primary source materials such as deck logs, and incident reports.

Though historical research leans heavily upon primary sources, several secondary sources will also be useful in fulfilling the three historical research goals. Several publications can be utilized for additional spatial data (Gentile 1992, 1993; Wagner 2010). Numerous sources have been written regarding German and Allied naval technology, tactics, and training (Morison 1947; Stick 1952; Frank 1955; Willoughby 1957; MacIntyre 1961,1971; Hughes and Costello 1977; Scheina 1982; Hoyt 1984, 1987; Gentile 1989; Hickam 1989; Cheatham 1990; Gannon 1990; Cheatham 1994; Howarth and Law 1994; Syrett 1994; Blair 1996;; Grove 1997; Kaplan and Currie 1997; Kemp 1997; Kaplan and Currie 1998; Wiggins 1999; Hague 2000; Miller 2000; Showell 2002; Westwood 2003; Ireland 2003; Williams 2003; Showell 2006; Watson 2006; White 2006; Brown 2007).

Archaeological Methodology

Stage One: Targeted Survey

In June 2011, NOAA and UNC Coastal Studies Institute and other partners conducted a wide area survey of bottomlands near Hatteras Canyon off Ocracoke, NC. The survey focused on identifying material remains of maritime history, primarily WWII shipwrecks. Out of approximately 135 square miles of seafloor, 48 targets were identified. The level of resolution for this wide area survey was such that it allowed researchers to identify

anomalies on the seafloor, but did not provide enough detail to determine the nature of these targets. This project will focus on returning to as many of these potential sites as possible, with the goal of collecting high-resolution imagery. This will be achieved through multibeam SONAR and still photography.

NOAA has evaluated each of these targets and determined which are most likely to yield cultural material based on the data available. Each site was assessed on a number of parameters (reflectivity, acoustic shadow, scour, etc…) and a prioritization was developed. Eight targets have been designated as the highest priority, with a remaining 40, which will be further prioritized and surveyed as time allows.

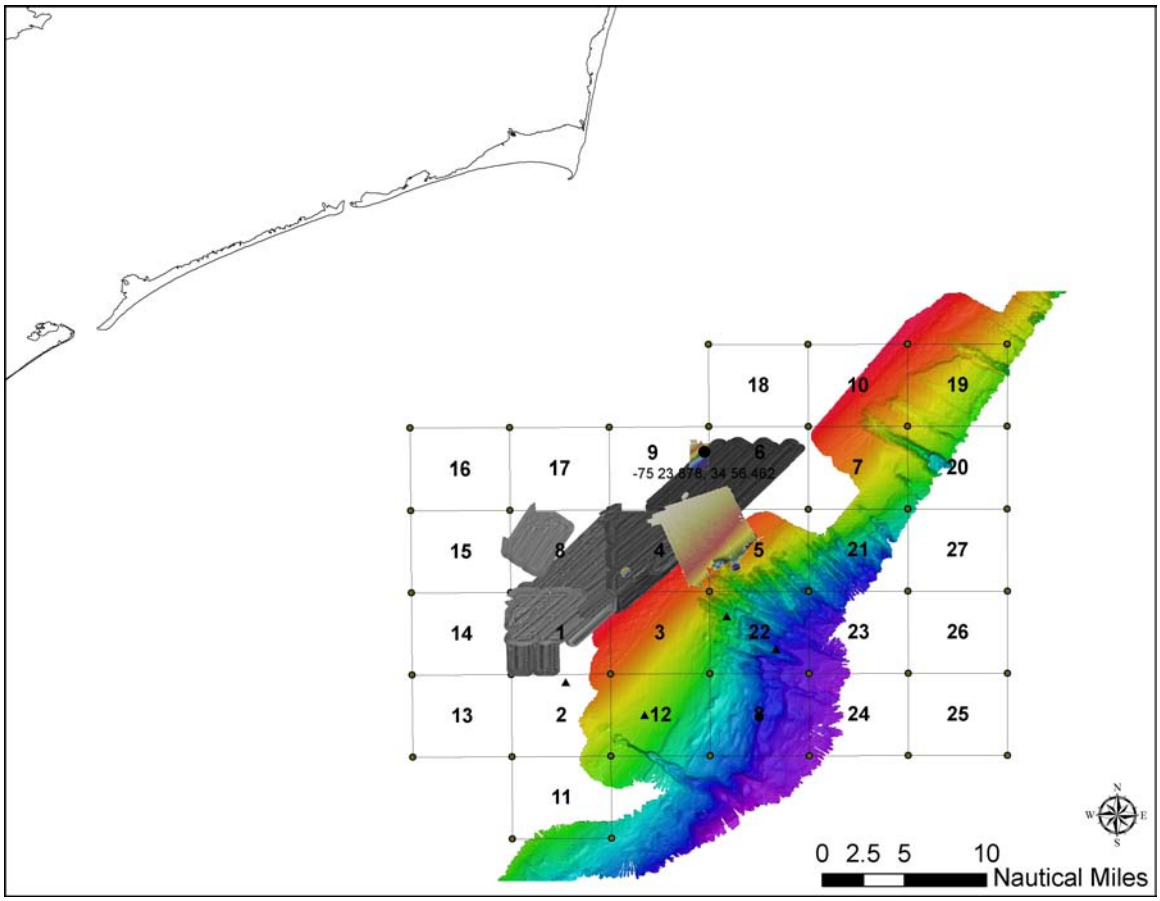


Figure 1.0 Complete coverage map of surveyed area including FY09 and FY11 data (NOAA).

This outlines the area and coverage maps of previous survey and describes in details the location of each site. The target output files collated below

are images obtained from the wide area assessment. Each of these has been ranked in priority as it is suspected that time and financial restraints will prevent the research team from accessing all 48 targets. It is suspected that given reasonably predictable weather conditions that a 10-day operational window can expect to yield 6-7 actual days of collecting data. If this is the case (or better) 2 sites are likely to be survey at a minimum per day. At this rate it is expected that 12-14 sites will be surveyed. This includes all high-priority targets as well as some secondary sites as well.

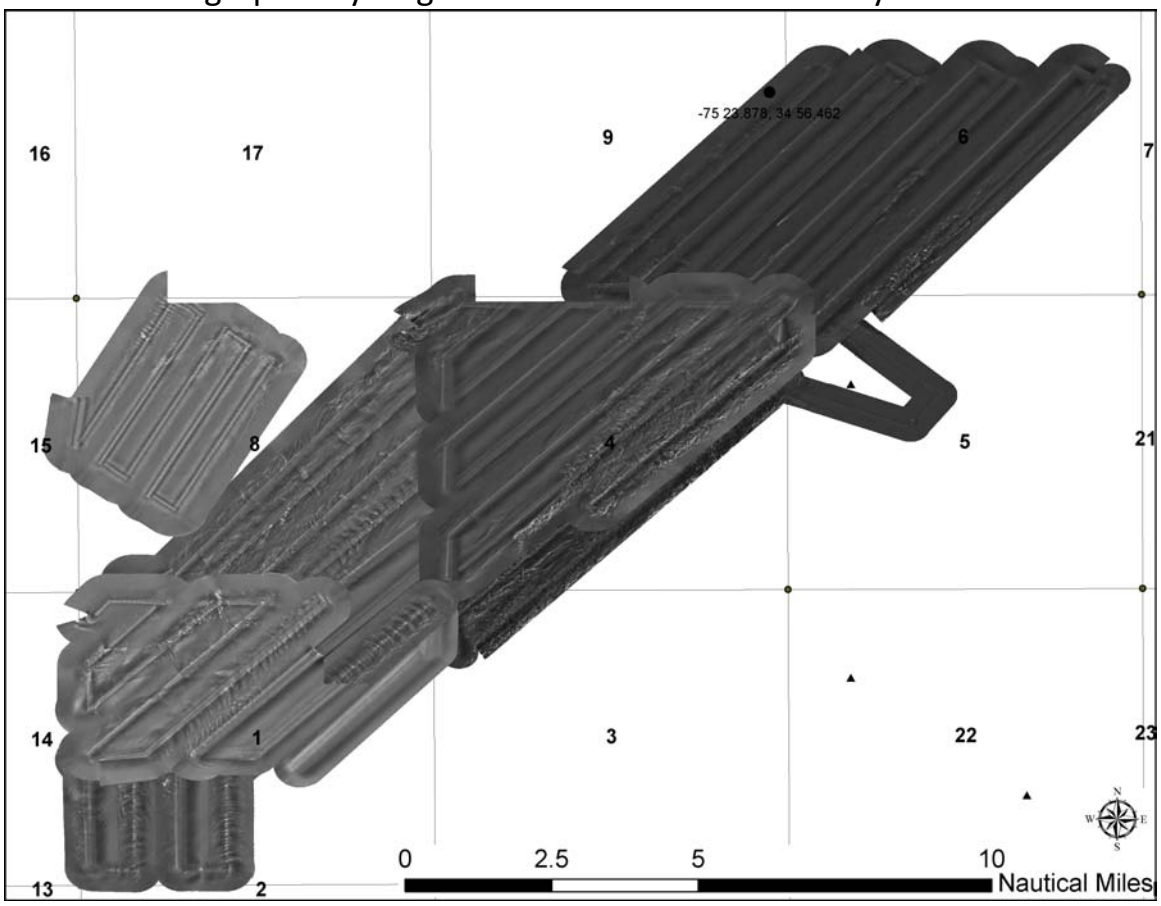
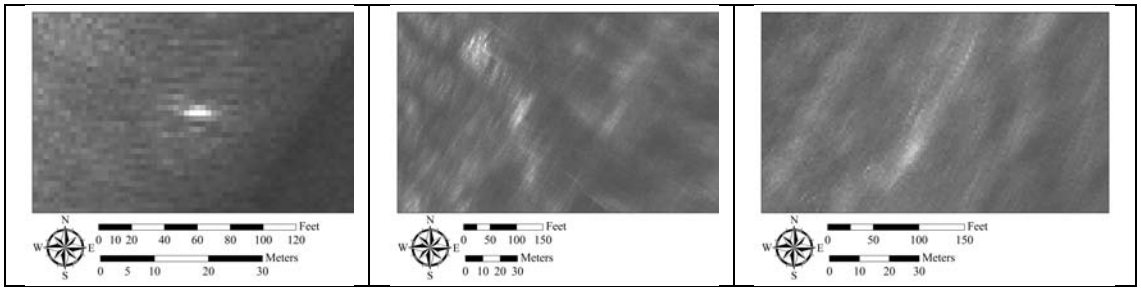
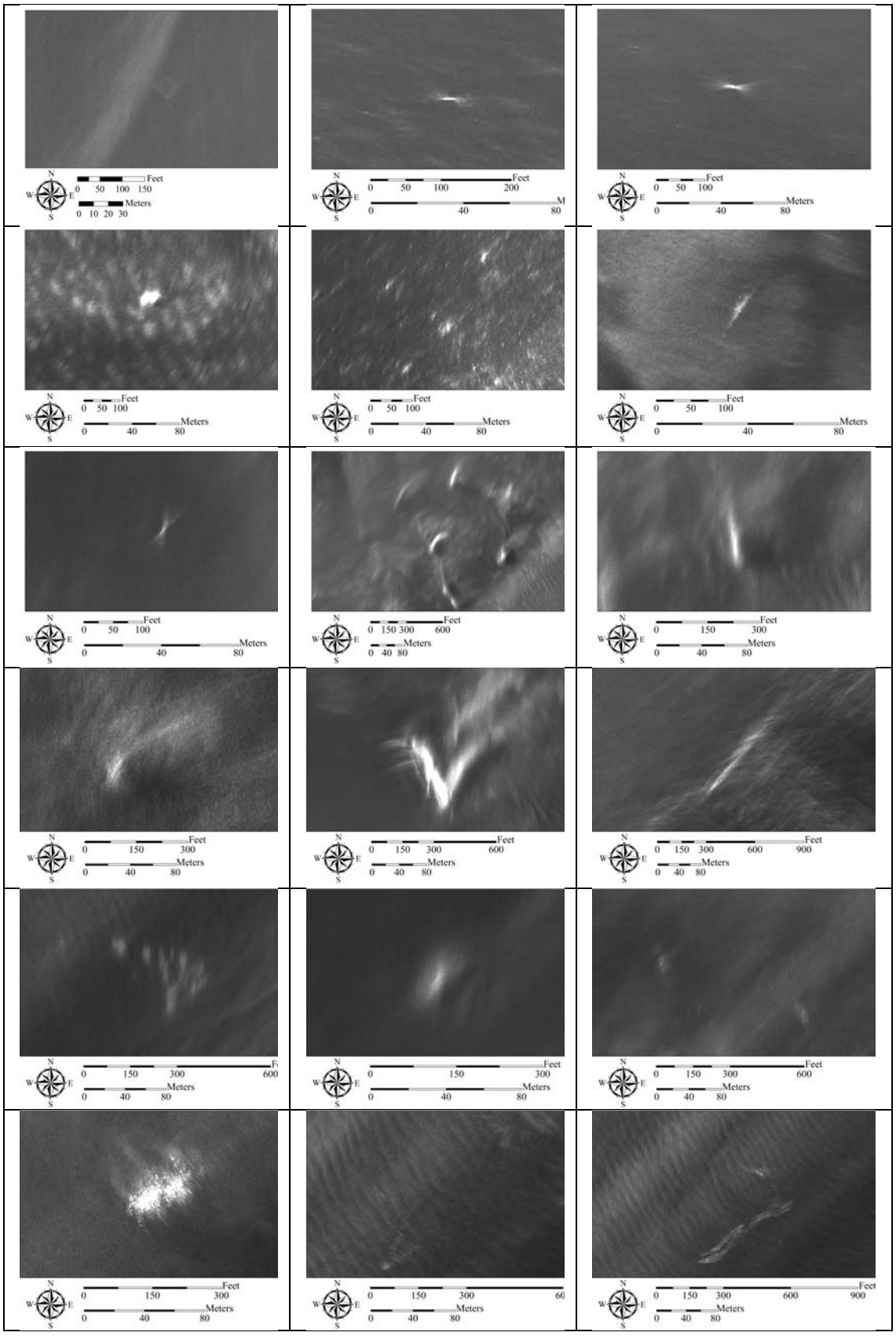


Figure 1.1 Complete coverage map of data collected with ARL:UT AUV survey (ARL:UT).





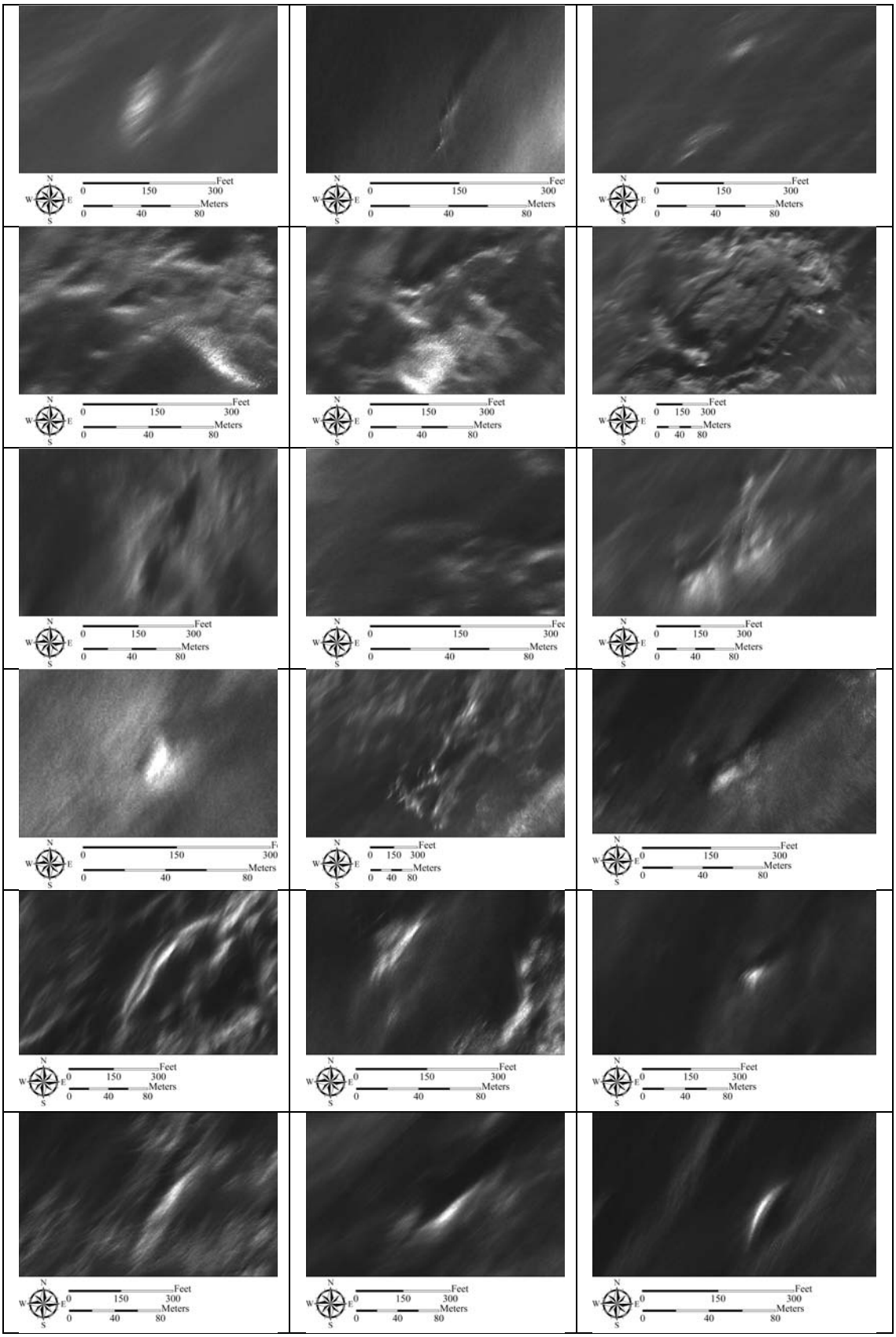
East Carolina University

Coastal Studies Institute
University of North Carolina

Renci
Renaissance Computing Institute
Catalyst for Innovation

National Marine Sanctuaries

NOAA



East Carolina University

Coastal Studies Institute
UNIVERSITY OF NORTH CAROLINA

Renci
Renaissance Computing Institute
Catalyst for Innovation

National Marine Sanctuaries

NOAA

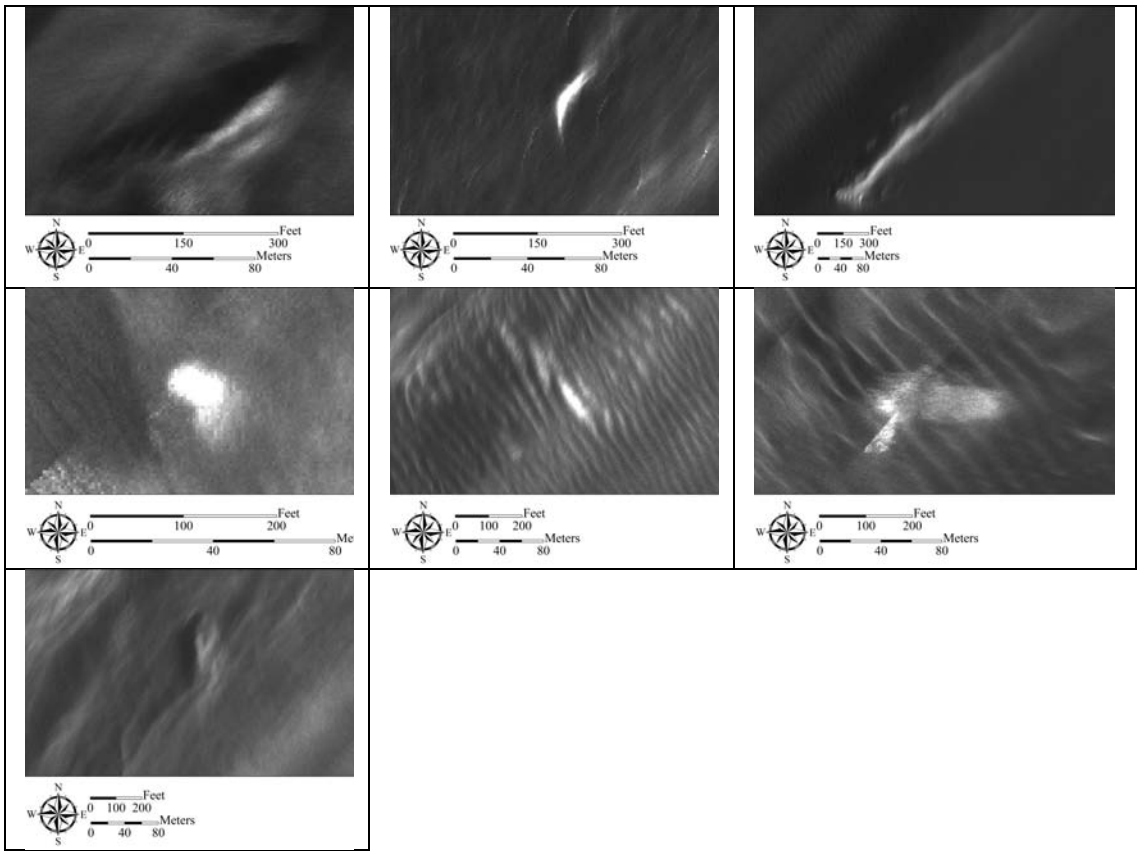


Table 1.3 Exported geo-rectified anomalies identified during wide area survey. Tiles are organized numerically (refer to table 0.0) based file names (ARL:UT – NOAA).

Day	Run	Reflect	Scour	Shadow	L-m	Iso.	Seabed	Passes	R-m	File-id
3-Jun	1	High	None	None	5	Y	Sand	1	37	**6030101**
3-Jun	1	Medium	None	Yes	93	Y	Sand	2	188	**6030102**
3-Jun	1	Low	None	Yes	55	Y	Sand	1	190	**6030103**
3-Jun	1	Low	None	None	16	Y	Sand	1	483	**6030104**
4-Jun	1	High	None	None	9	Y	Sand	1	304	**6040101**
4-Jun	1	High	None	None	14	Y	Sand	1	395	**6040102**
4-Jun	1	High	None	Yes	18	Y	Sand	1	0	**6040103**
4-Jun	1	High	None	None	9	N	Sand	1	101	**6040104**
4-Jun	1	Medium	None	Yes	23	Y	Sand	1	127	**6040105**
4-Jun	1	High	None	None	7	Y	Sand	1	326	**6040106**
4-Jun	1	High	Yes	Yes	58	N	Mixed	1	365	**6040107**
4-Jun	1	High	None	Yes	52	Y	Mixed	1	285	**6040108**
7-Jun	1	Medium	Yes	Yes	89	Y	Sand	1	217	**6070101**
7-Jun	1	High	Yes	Yes	111	Y	Sand	2	445	**6070102**
7-Jun	1	High	None	None	150	Y	Sand	1	352	**6070103**
7-Jun	2	Medium	None	Yes	103	Y	Sand	1	140	**6070201**
7-Jun	2	Medium	None	Yes	22	Y	Sand	1	328	**6070202**
7-Jun	2	Medium	None	Yes	43	N	Sand	2	100	**6070203**
7-Jun	2	High	None	None	53	Y	Sand	1	0	**6070204**

7-Jun	2	Low	None	None	170	Y	Sand	1	56	**6070205**
7-Jun	2	Medium	Yes	Yes	150	Y	Sand	1	0	**6070206**
7-Jun	2	Medium	Yes	Yes	55	Y	Sand	2	476	**6070207**
7-Jun	2	Medium	Yes	Yes	30	Y	Rock	1	230	**6070208**
7-Jun	2	Medium	None	Yes	45	N	Sand	1	350	**6070209**
7-Jun	2	High	None	Yes	105	N	Rock	1	80	**6070210**
7-Jun	2	High	None	Yes	86	N	Rock	1	151	**6070211**
7-Jun	2	High	None	Yes	48	N	Rock	1	154	**6070212**
7-Jun	2	Medium	None	Yes	105	N	Rock	1	255	**6070213**
7-Jun	2	Medium	None	Yes	46	N	Rock	1	220	**6070214**
7-Jun	2	High	Yes	Yes	110	N	Rock	1	235	**6070215**
7-Jun	2	High	None	Yes	16	N	Rock	1	116	**6070216**
7-Jun	2	Medium	None	Yes	94	N	Mixed	1	194	**6070217**
8-Jun	1	High	Yes	Yes	49	Y	Mixed	1	55	**6080101**
8-Jun	1	High	None	Yes	95	N	Rock	1	266	**6080102**
8-Jun	1	High	None	Yes	52	N	Rock	1	213	**6080103**
8-Jun	1	High	Yes	Yes	27	N	Mixed	1	235	**6080104**
8-Jun	1	High	Yes	Yes	67	N	Rock	1	235	**6080105**
8-Jun	1	High	Yes	Yes	80	N	Rock	1	386	**6080106**
8-Jun	1	High	None	Yes	48	N	Rock	1	400	**6080107**
8-Jun	1	High	Yes	Yes	78	Y	Rock	1	146	**6080108**
8-Jun	1	High	Yes	Yes	37	Y	Sand	1	199	**6080109**
8-Jun	1	High	Yes	Yes	70	Y	Sand	1	250	**6080110**
9-Jun	1	High	None	None	18	Y	Sand	1	138	**6090101**
9-Jun	1	High	Yes	None	40	Y	Sand	1	182	**6090102**
9-Jun	1	High	Yes	None	81	Y	Sand	2	0	**6090103**
9-Jun	1	Medium	Yes	Yes	76	Y	Sand	1	207	**6090104**

Table 1.0 Spreadsheet depicting select evaluation criteria for 47 anomalies observed during wide area survey (NOAA).

Each wreck site will be mapped using SRI's 12.75-in. diameter AUV equipped with high frequency multibeam sonar. For the initial site survey, to accurately locate a given wreck and to determine the extent of the debris field and maximum vertical relief, the AUV will be operated at an altitude of 10-20 meters above the maximum known relief of the shipwreck (**Figure 2**). For the following dive, the AUV will be programmed to fly at a reduced altitude of 5-10 meters above the maximum measured vertical relief of the shipwreck (**Figure 3**). This approach will produce sub-decimeter resolution data sets, which should be more than adequate to detect general shipboard structures. The AUV's calibrated inertial navigation system (INS) will provide the artifact locations geodetically accurate to within a few meters. For an individual shipwreck site, the data from all the multibeam sonar dives will be combined into a single 3D point cloud data product. This will provide an intuitive 3D model for viewing the area and determining the disposition of the wreck, detect site artifacts, and provide surrounding bathymetry. Georeferenced images (GeoTIFFs and JPGs with World files) and/or microbathymetric maps will also be produced for use with various GIS programs (**Figure 4**). As time and conditions permit selected sites will be photographed using an

Imenco SDS 1210 digital stills camera with an external strobe both provided by NOAA.
The SRI AUV payload and support system includes the following components:

- Low frequency (260 kHz) Delta-T Multibeam sonar for initial site safety surveys
- High-resolution, custom BlueView multibeam sonar to create microbathymetric maps and 3D scenes
- Sensor payload data logger and control module. This includes support for powering and logging of sonar data and powering and control of the SDS 1210 digital stills camera with an external strobe
- Calibrated ultra-short baseline (USBL) system with depth telemetry for precise underwater tracking and INS updates via acoustic modem
- AUV safety systems: acoustic modem, RF beacon, light strobe, and emergency drop weight
- F190 GPS positioning and attitude system for sub-decimeter topside support
- Fledermaus software for sonar data processing and 3D visualization
- NOAA and SRI are also collaborating to incorporate a GoPro video housing into the AUV payload.

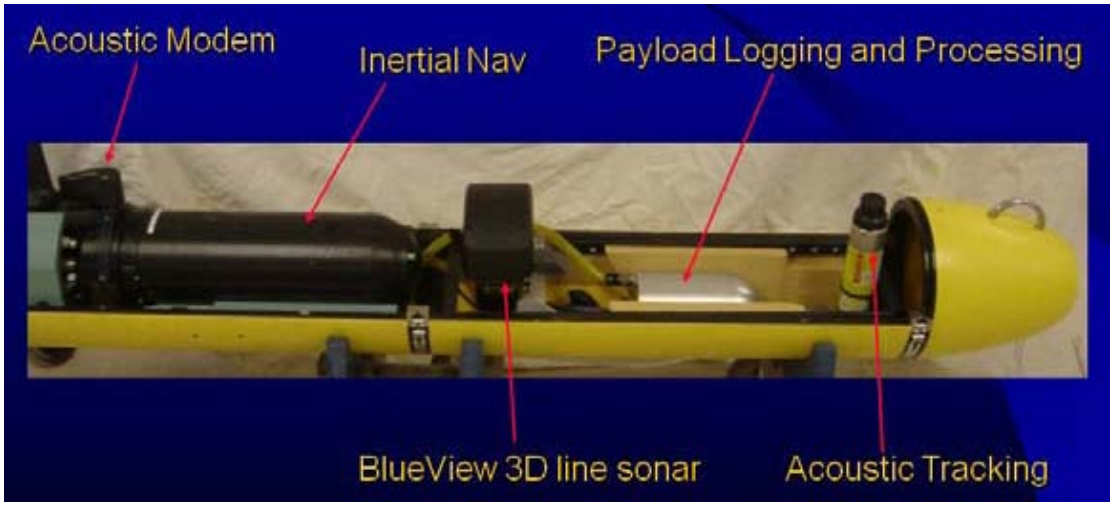
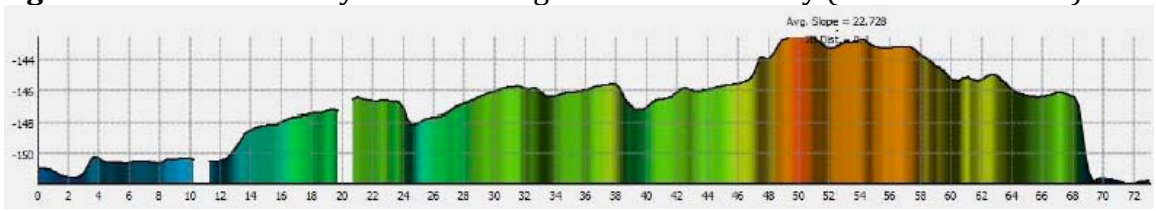


Figure 1.4 Bluefin AUV system as configured for this survey (SRI International)



High Resolution Survey Setup

1. Fly at a constant depth of 130 meters, 3 knots (10 m altitude safety)
2. Line Spacing 5 m (MB1350 swath 8 m)
3. Conduct North-South Survey 100 m (N-S) x 150 m wide (E-W)
4. At 3 kts (1.5m/s) approximately 1.5 hr survey

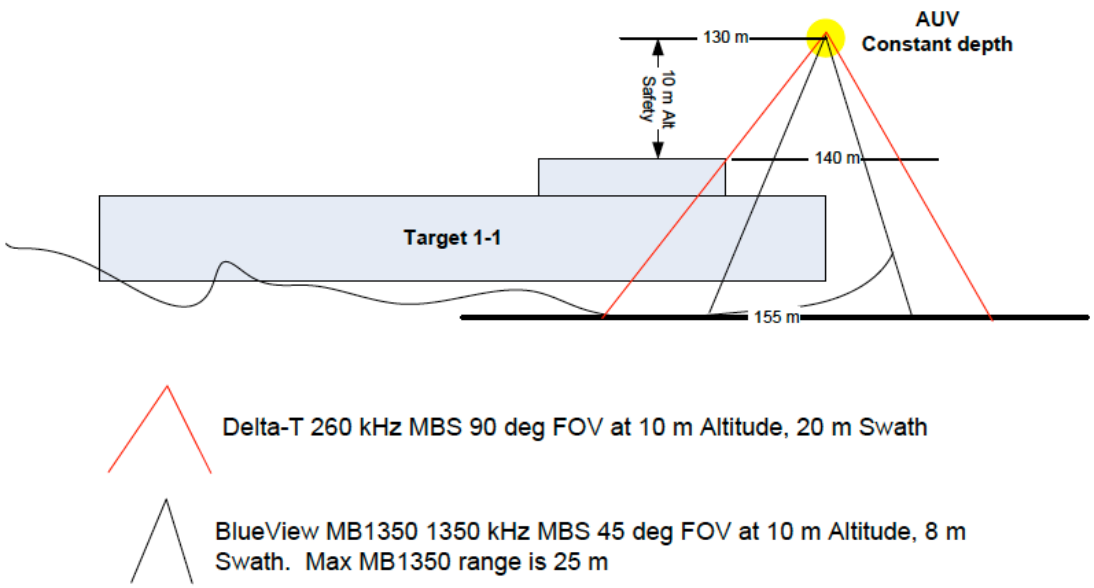


Figure 1.5 This graphic describes the process of each AUV dive as conducted on Target 1-1 (SRI International).

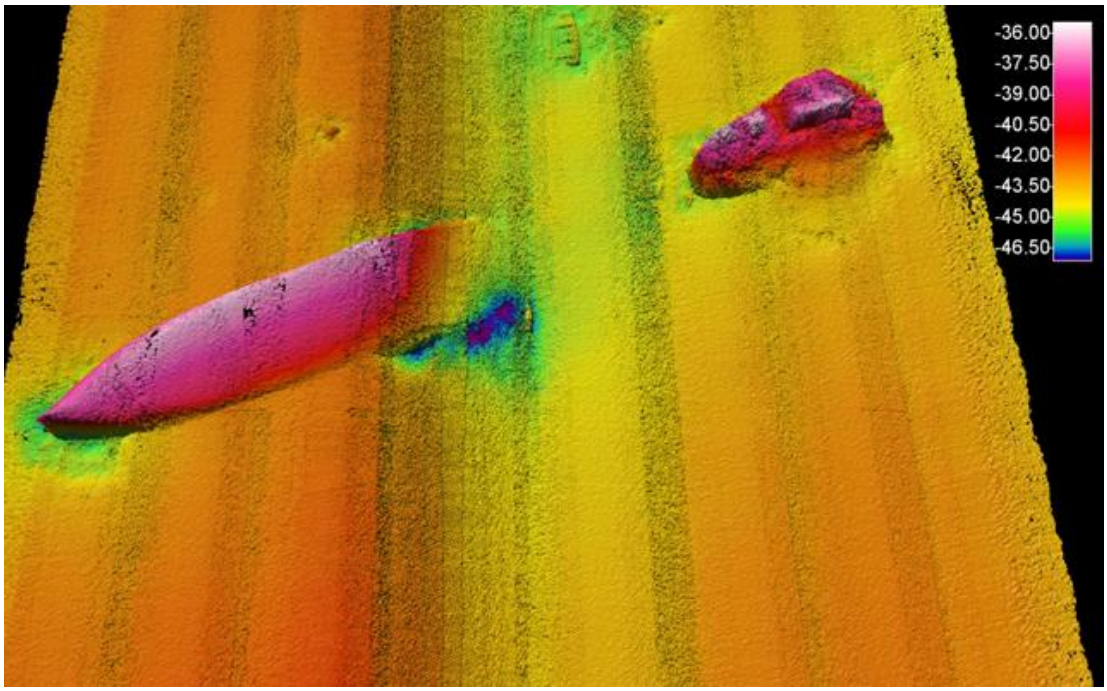


Figure 1.6 High resolution test site of the WWII Tanker *Empire Gem* (SRI/NOAA).

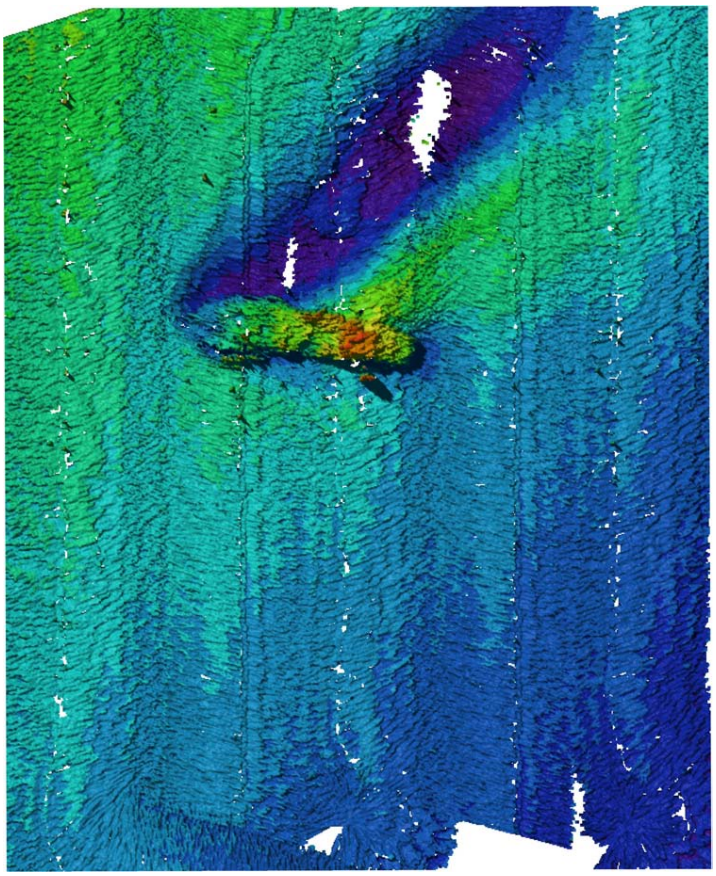


Figure 1.7 Medium resolution survey of Target 1-1 (SRI/NOAA).

Stage Two: Diver Based In-Water Assessments

This phase of the project will focus heavily on WWII sites known or believed to be in the area on which NOAA and partners have little or no data recorded. In some cases locations and tentative identifications are posited and not confirmed. It is the intent to access these sites with the purpose of conducting a detailed assessment and creating a comprehensive and accurate GIS database of WWII wrecks off North Carolina. The following spreadsheet list the sites and prioritizes them based on proximity to operational inlets, depth and level of known information. The sequence of accessing these sites will be adaptable based on prevailing weather conditions and various operational restrictions.

Vessel Name	LAT_DD	LONG_DD	DATA	Depth	ID	Inlet	Tier	DATA Needs
W.E. Hutton	34.143692	-76.652352	MB	125.00	Y	Beaufort	2	Imagery
Suloide	34.544786	-76.894991	MB	65.00	Y	Beaufort	2	Imagery
Naeco (Stern)	34.025336	-76.648065	MB		Y	Beaufort	2	Imagery
Esso	33.879095	-77.226790	MB	120.00	Y	Beaufort	2	Imagery

Nashville								
Cassimir	33.965843	-77.030853	MB	120.00	Y	Beaufort	2	Imagery
Caribsea	34.633333	-76.316667	MB	80.00	Y	Beaufort	2	Imagery
Byron Benson	36.149100	-75.246200	MB	105.00	Y	Oregon	2	Imagery
Australia	35.122200	-75.333300	MB	110.00	Y	Hatteras	2	Imagery
Atlas	34.528332	-76.241872	MB	125.00	Y	Beaufort	2	Imagery
Ario	34.499330	-76.897870	MB	70.00	N	Beaufort	2	Imagery
Ashkhabad	34.378100	-76.361400	NONE	55.00	Y	Beaufort	1	ALL
Empire Thrush	35.196700	-75.233333	NONE	65.00	Y	Hatteras	1	ALL
F.W. Abrams	35.083333	-75.666700	NONE	90.00	Y	Ocracoke	1	ALL
John D. Gill	33.841700	-77.458300	NONE	90.00	Y	Cape Fear	1	ALL
Liberator	34.079600	-75.391300	NONE	120.00	Y	Hatteras	1	ALL
Malchace	34.604200	-75.786900	NONE	205.00	Y	Beaufort	3	ALL
Equipoise	36.600000	-74.750000	NONE	140.00	N	Oregon	1	ALL
Chenango	36.416700	-74.916700	NONE	140.00	N	Oregon	1	ALL
Marore	35.550000	-74.966670	NONE	130.00	Y	Oregon	1	ALL
Norvana	36.116700	-75.383300	NONE	110.00	Y	Oregon		ALL
Panam	34.166670	-76.083300	NONE	480.00	N	Beaufort	3	ALL
Papoose	35.433333	-75.183330	NONE	200.00	N	Hatteras	3	ALL
San Delfino	35.666667	-75.066670	NONE	110.00	N	Hatteras	1	ALL
HMT Senateur Duhamel	34.551700	-76.605000	NONE	60.00	Y	Beaufort	2	ALL
USCG Bedloe	35.483500	-75.249600	NONE	80.00	Y	Oregon		ALL
USCG Jackson	35.483500	-75.249600	NONE		Y	Oregon		ALL
Venore	35.016667	-75.533330	NONE	90.00	N	Hatteras	1	ALL
Equipoise	36.600000	-74.750000	NONE	140.00	N	Oregon	1	ALL

Table 0.0 Sites which may be assessed during the 2012 field season.

Site specific files will be kept on the vessel to aid in identification while in the field. This research design identifies several goals and questions to be addressed during the investigation. These assessments are designed to gather enough data on each site to determine National Register eligibility and follow the guidelines of the National Historic Preservation Act. The goals proposed include:

1) Assessing the historical significance and archaeological integrity of each individual site;

2) Determining if the resources are eligible for nomination to the National Register of Historic Places;

3) Identify to what degree is site preservation influenced by environmental formation processes and cultural impact;

4) Determine whether or not the sites warrant further investigation;

5) Complete a thorough exterior survey of each site and artifact inventory;

6) Produce a site map (or photomosaic) of each site for interpretation and as a representation of baseline data for use in follow-up inquiry and future monitoring at the sites;

7) Complete a detailed video and photographic surveys of the sites.

In order to answer these questions, the survey goals are designed to recover data that would identify the sites, and contribute to their nomination to the National Register of Historic Places. Only through site documentation and the recording of diagnostic features and artifacts can the nomination process be completed.

Scope and Limitations

As with any project, certain limitations are present that are taken into account in preparing the expedition. Fiscal constraints limit the amount of time and the availability of resources, which typically governs the duration of the project. As conditions off North Carolina vary, predicted days of inactivity are built-in and personnel will spend time processing data sets during this time.

Additionally, the sites locations also pose limitations underwater. High and variable currents may be present, and visibility may range from zero to more than one hundred feet. These factors produce differing degrees of in-water efficiency from day-to-day. Furthermore, the depth of the sites, ranging from 90-240 feet deep, greatly limits the amount of time that can be spent on site each day.

The sites being treated as graves, also presents some limitations that will be meticulously observed. This limits the survey to exterior observations only. In addition, the research team will not conduct any exterior work that would impact or disturb the site in any way. This precludes, establishing permanent baselines or removing or manipulating anything on-site.

Personnel and Equipment

The overall project will be planned and conducted by the NOAA, Office of National Marine Sanctuaries *Monitor* National Marine Sanctuary, in cooperation with Bureau of Ocean Energy Managment as the lead agencies.

Equipment used will include traditional survey instruments such as fiberglass measuring tapes, slates, mylar sheets, clinometers, and straight edge scales. These

instruments will be used to recover detailed measurements of the site and the data will later be transferred to a master site plan. Photographic and videographic data will be acquired using a range of instruments.

Each partner will be providing particular equipment, including remote sensing equipment, dive gear, corrosion analysis equipment, and photographic equipment. All data recovered during this project will become available for use by NOAA.

Environment

Each site lies in a dynamically different environment. The waters off of North Carolina, Cape Hatteras in particular, are an interface for two major oceanic currents. Coming down from the north are cold waters of the Labrador Current. From the south flows the warm waters of the Gulf Stream. The two currents carry with them different properties and support very different ecosystems. The position of the target sites is such that each lies within this interface (Figure 4.2).

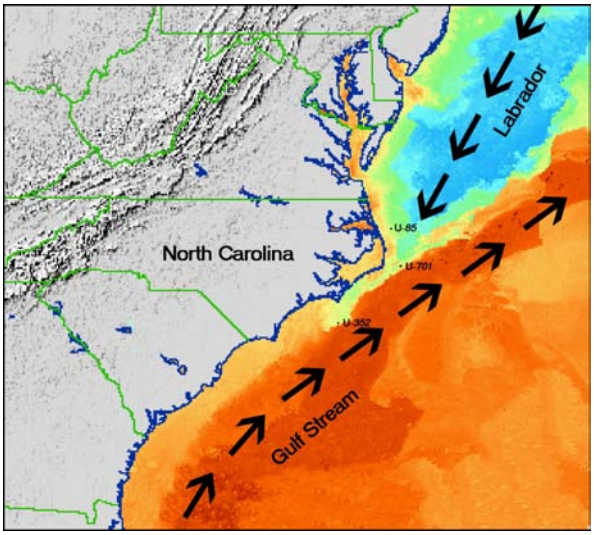


Figure 4.2. Image showing the convergence of oceanic currents

These sites lie in potentially highly dynamic area where the Gulf Stream and the Labrador collide. This creates a high degree of variability in currents and has a noticeable effect on shifting sands, creating deep scours and deposits which shift continually.This is believed to cause periods of episodic scour and fill-in at these sites.

In-Water Documentation

1. Documentation of the sites by generating detailed site plans and recording diagnostic features
   (a) Identify and record diagnostic structural features such as deck machinery, hatches, etc.
   (b) Identify and record hull damage due to the sinking event

(c) Identify and record hull damage caused to the sites post-sinking due to natural and/or man-made causes
(d) Identify and record all exposed artifacts within the sites immediate vicinity
(e) Identify, record, and determine the extent of hazardous material remaining on the site while maintaining all safety protocols

2. Create scaled photo-mosaics of the sites by generating plan and profile photo-mosaics and supplement with hull measurements
(a) Conduct plan view photo-mosaic survey by video documenting sites using the photo-mosaic sled as a platform coupled with digital sonar to maintain a minimum of 30 ft. above the subject
(b) Conduct profile and oblique photo-mosaics surveys by video documenting sites using the photo-mosaic sled or scooters as a platform coupled with digital sonar to hold a constant distance from the sites and depth gauge to hold a constant depth while moving from bow to stern
(c) Combine photo-mosaic data with the diver generated site plans

3. Intensive video and photo documentation of the hull and diagnostic features
(a) Video/Photograph hull and diagnostic hull features from all angles
(b) Video/Photograph diagnostic artifacts from all angles with scaling device

4. Identify and document areas on the sites to monitor hull and structural degradation over time
(a) Select features on the bow, amidships, and stern that would best illustrate hull and structural degradation over time
(b) Document the extent of the features degradation
(c) Clearly identify the features on the site plans for future reference
(d) Document the list on the sea floor by calculating the degree of angle with a clinometer to determine the current pitch and roll of the hull

5. Document artifacts, and any hazardous material, *in situ* showing their spatial relationships viz a viz the rest of the shipwreck
(a) Video, measure, and record exposed artifacts, and hazardous material *in situ*, and their relation to the rest of the site
(b) Identify artifacts with diagnostic features and makers' marks

Assessment

1. Identify the sites and make recommendations for future management
(a) Identify sites name and type
(b) Assess if historical accounts coincide with archaeological interpretations
(c) Assess whether additional fieldwork is needed
(d) Nominate the site to the National Register of Historic Places
(e) Make suggestions for public interpretation

2. Determine if remaining artifacts are threatened and/or have historical significance

(a) Identify artifacts of historical significance or unique type
(b) Identify artifacts of duplicative objects
(c) Evaluate danger to artifacts if left undisturbed

3. Determine if there are environmental hazards remaining at the sites and make recommendations for their possible removal or neutralization

(a) Identify environmental hazards at the site and contact the appropriate federal government oversight agency (*i.e.* U.S. Coast Guard)
(b) Identify ordnance at the site and contact the U.S. Navy, and NOAA General Consul
(c) Make recommendations for the possible removal or neutralization of any environmental hazards that balances public safety with preserving the historical significance and integrity of the site

4. Determine the site stability and integrity of each site and make recommendations for its long term preservation

(a) Assess site damage and determine if it was caused by the sinking event or post-sinking
(b) Evaluate post-sinking hull damage/alterations and determine causes based on environmental and cultural considerations.
(c) Evaluate long-term hull integrity and make recommendations for site preservation

In planning for factors beyond control (*e.g.* inclement weather, equipment breakdown, personal illness, poor visibility on the site, etc.) the task list is designed to provide flexibility and adaptability. Dive tasks could require a single dive or multiple dives, but each task is related to a discrete objective. The tasks are prioritized, and some tasks may not be conducted until others have been completed.

Operating within the conditions outlined above the archaeological investigation of these sites will likely produce useful results. These environmental parameters establish the conditions that are potential detractors on site and may have impact on the work conducted. The diving procedures also govern the scope and practicality of each goal set forth. Ultimately the research questions and goals, in tandem with these other limitations and conditions, guide the project. These conditions are important to understand in order to be able to address these conditions as they are encountered.

DIVING ACCIDENT MANAGEMENT PLAN

For Areas in the Vicinity of the *Monitor* National Marine Sanctuary

OFFICE: 757-591-7326

A Diving Accident Management Plan is prepared for each diving locale and operation. The Plan is to be implemented in the event of a diving emergency.

Dive Accident Plan: <u>Conscious and Alert Diving Accident Victim</u>

Evaluate victim's Airway, Breathing, and Circulation (ABCs).

Contact LCDR Joel Dulaigh, USPHS, (NOAA Diving Medical Officer) Seattle, WA cell – (206) 300-2098.

Activate local EMS - Call 911 to report the diving accident. If unable to contact 911 EMS system, contact U.S. Coast Guard in Hatteras/Ocracoke at 252-475-8205 or hail them on VHF radio, channel 16, to report the diving accident. The EMS dispatcher will notify emergency medical land transportation. Planned destination for treatment: **CHESAPEAKE REGIONAL MEDICAL CENTER**, and the hyperbaric chamber at **CHESAPEAKE REGIONAL MEDICAL CENTER**. Tell the EMS dispatcher where the boat will be docking (Ocracoke Ferry Terminal, Hatteras Ferry Terminal).

Put the victim on 100% oxygen using a positive-pressure/demand oxygen resuscitator.

Evaluate the victim and gather additional information about the incident:

Perform and record results of 5-minute field neurological examination on the affected diver

Gather and record patient vitals and as much information about the dive as possible

Interview the victim's dive buddy for additional information

Evaluate buddy for onset of similar pressure related symptoms

Secure victim's dive gear for examination. (Do not disassemble gear or exhaust any air from the diving system)

If decompression sickness is suspected, or any other type of pressure-related injury (arterial gas embolism, pneumothorax, etc.) allow the victim to remain in the position of comfort (Do not raise the victim's legs). Place the victim on his/her side if nauseated or vomiting. Always maintain a clear airway.

The victim is to be transported to **CHESAPEAKE REGIONAL MEDICAL CENTER Emergency Room**, Chesapeake, North Carolina, for evaluation. If possible, the victim's buddy should also be transported.

If not nauseated and not experiencing altered level of consciousness, give the victim water to drink during transportation to the **CHESAPEAKE REGIONAL MEDICAL CENTER**.

Continue oxygen administration. Send any and all information about the dive and post-dive observations with the victim to the hospital, including results of field neurological examination.

Keep victim comfortable and observe for shock or changes in condition.

Based on the evaluation by the physician at **CHESAPEAKE REGIONAL MEDICAL CENTER Emergency Room** or equivalent, the victim may be transported to

the **Chesapeake General Hospital Wound Healing and Hyperbaric Medicine** for treatment.

Dive Accident Plan: <u>Unconscious and Non-Responsive Dive Accident Victim</u>

Evaluate victim's Airway, Breathing, and Circulation (ABC's)

Call 911 as indicated above or USCG.

Start cardio-pulmonary resuscitation, or rescue breathing using a positive-pressure/demand oxygen resuscitator.

Evaluate the victim and gather additional information about the incident:
Gather and record as much information about the dive as possible
Interview the victim's dive buddy for additional information
Secure victim's dive gear for examination (Do not disassemble gear or exhaust any air from the diver's life support system.)

Transport the victim to the harbor or port facilities closest to the dive site where a local ambulance or medic unit should be standing-by to evacuate the victim to **CHESAPEAKE REGIONAL MEDICAL CENTER Emergency Room**. If possible, the victim's buddy should also be transported. If there is a problem transporting the victim to the nearest harbor or if the time delay is significant (>2 hours), call or radio the USCG at 1-252-475-8205 or VHF – channel 16, to arrange air evacuation of the victim. The USCG air evacuation team will coordinate with **CHESAPEAKE REGIONAL MEDICAL CENTER WOUND HEALING AND HYPERBARIC MEDICINE CENTER**. Site personnel should review procedures and prepare for helicopter evacuation.

Medical Assistance and Recompression Chamber Contact Information Emergency DMO Contacts:

Primary recompression chamber facility:

Chesapeake Regional Medical Center: Wound Healing and Hyperbaric Medicine Center
736 Battlefield Blvd., North. Chesapeake, VA 23320
Chamber Phone: 757-312-6510
24 hour phone: 757-312-8121
ER: 757-312-6200

Emergency DMO Contacts:

Contact	Phone numbers
Local EMS	911
USCG	1-252-475-8205 or VHF Channel 16
Joel Dulaigh, LCDR, USPHS, DMO	(206) 300-2098 (cell)
MOC-P Medical Officer on call	(206) 409-8725 (cell)
MOC-A Medical Officer on call	(757) 615-6619 (cell)

Divers Alert Network:

i. Duke University Medical Center, Durham, N.C.
(919) 684-9111 (24 hour emergency telephone number)

Secondary recompression chamber facility:

ii. Duke University Medical Center, Durham, N.C.

iii. 919-684-6726 (24 hour emergency telephone number)

Tertiary recompression chamber facility:

iv. Bon Secours DePaul Medical Center.

v. 757-889-5770 (24 hour emergency telephone number)

Monitor NMS Office:

vi. 100 Museum Drive, Newport News, Va 23606.

vii. 757-599-3122
Joe Hoyt-Principal Investigator
Work: 757-591-7336
Cell: 252-412-2008

David Alberg-Superintendent
Work: 757-591-7326
Cell: 757-8694291

Non-Emergency Vessel Problems:

viii. Tow Boat US, Hatteras, NC.

ix. VHF: Channel 16

x. 252-475-0690

Note: Before commencing dive operations, the Divemaster will contact the primary recompression chamber to ensure that the chamber is operational and available to receive patients. If the primary chamber is not operational, alternate facilities should be contacted.

REFERENCES

Abbass, D. K.

2000 *Rhode Island Marine Archeology Project Field Report: A Brief Report on the RIMAP Investigation of the Fleet of Ships Lost in Rhode Island During the American Revolution*. Rhode Island Marine Archaeology Project, Newport.

Adams, Christopher D., Diane E. White, and David M. Johnson

1999a *Dark Canyon Rancheria Apache/Military Battle Site.* Lincoln National Forest, Alamogordo, NM.

1999b *Last Chance Canyon 1869 Apache/Calvary Battle Site, Lincoln National Forest, New Mexico*. Lincoln National Forest Heritage Program, Alamogordo, NM.

Alexander, Lawrence S., and Elsa Heckman

2002 *Archaeological and Historical Survey and Preparation of a Battlefield Protection Plan for the Western Perimeter of the Lookout Mountain Battlefield, Hamilton County, Tennessee*. Alexander Archaeological Consultants, Chattanooga TN.

Allegood, J.

2004 The U-boat, *News and Observer*, December 5, 2004.

Arnold, J.B. III, T.J. Oertling, and A.W. Hall

1999 The Denbigh Project: Initial observation on a Civil War blockade-runner and its wreck site. *International Journal of Nautical Archaeology* 28(2):126-44.

2001a The Denbigh Project: Excavation of a Civil War blockade-runner. *International Journal of Nautical Archaeology* 30(2):231-249.

2001b The Denbigh Project: Test excavations at the wreck of an American Civil War blockade-runner. *World Archaeology* 32(3):400-412.

Arnold, J.B. III, C.P. Weldon, G.M. Fleshman, C.E. Peterson, W.K. Stewart, and G.P. Watts

1992 USS *Monitor*: Results from the 1987 season. *Historical Archaeology* 26(4):47-57.

Babits, Lawrence E., Christopher T. Ephenshade, and Sarah Lowry

2010 Battlefield Analysis: Six Maritime Battles in Maryland, Revolutionary War and War of 1812. Report to Maryland Historical Trust, Crownsville, MD, from New South Associates, Stone Mountain, GA.

Balicki, Joseph

2009 The Confederate cantonment at Evansport, Virginia, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 255-277. Potomac Books Inc., Dulles, VA.

Bedell, John

2005 *Archeological and Historical Investigations of the Buckland Mills Battlefield, Buckland, Virginia.* The Louis Berger Group, Inc., Washington, D.C. GA-2255-04-001

Bevan, Bruce M.

1999 *A Geophysical Survey on the Spackman Farm, Brandywine Battlefield National Historic Landmark*. Geosite, Weems, VA.

Birch S., and D.M. McElvogue

1999 *La Lavia, La Juliana* and the *Santa Maria de Vision*: Three Spanish Armada transports lost off Streedagh Strand, Co Cligo: An interim report. *International Journal of Nautical Archaeology* 28:265-76.

Blair, Clay

1996 *Hitler's U-Boat War: The Hunters, 1939-1942*. Random House, New York, NY.

2000 *Hitler's U-boat War: The Hunted, 1942-1945*. Random House, New York, NY.

Blake, Samuel

2006 A Comparative Study of the Effectiveness of German Submarine Warfare on the Eastern Seaboard of the United States in the World Wars. Master's Thesis, Department of History, East Carolina University, Greenville, NC.

Bratten, John R.

1996 The Continental Gondola *Philadelphia*: A new look at American's oldest surviving warship. In *Underwater Archaeology: Proceedings form the Conference on Underwater and Historical Archaeology,* S.R. James Jr., and C. Stanley, editors, pp.112-116. Cincinnati, Ohio.

2002 *The Gondola Philadelphia and the Battle of Lake Champlain*. Texas A&M Press: College Station.

Brennecke, Jochen

2003 *The Hunters and the Hunted: German U-boats, 1939-1945*. Bluejacket Books, Naval Institute Press, Annapolis, MD.

Brent, Joseph E., and W. Stephen McBride

1996 *Conflict, Occupation and Contraband: Corinth Mississippi in the Civil War.* Mississippi Department of Archives and History, Jackson.

Brent, Joseph E., Maria Campbell Brent, E. Stephen McBride, W. Hunter Lesser

2010 *The Camp Elkwater Project, Randolph County, West Virginia.* Mudpuppy & Waterdog, Inc., and McBride Preservation Services. GA-2255-08-018

Bright, John C.

2011 Stalking the Gray Wolf: A KOCOA Terrain Analysis of the Battle of the Atlantic off the North Carolina Coast. Master's Thesis Prospectus, Department of History, East Carolina University, Greenville, N.C.

Broadwater, John D.

1980 The Yorktown Shipwreck Archaeological Project: Results from the 1978 survey. *International Journal of Nautical Archaeology* 9(3):227-35.

1992 Shipwreck in a swimming pool: An assessment of the methodology and technology utilized on the Yorktown Shipwreck Archaeological Project. *Historical Archaeology* 26(4):36-46.

2011 Naval battlefields as cultural landscapes in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. 165-176. Texas A&M University Press, College Station.

Broadwater, John D., R.M. Adams, and M. Renner

1985 Yorktown shipwreck archaeological project: An interim report on the excavation of shipwreck 44YO88. *International Journal of Nautical Archaeology and Underwater Exploration* 14:301-14.

Brown, David K.

2007 *Atlantic Escorts: Ships, Weapons & Tactics in World War II*. Naval Institute Press, Annapolis, MD.

Bunch, Jim W.

2003 Germany's *U-85*: A Shadow in the Sea; A Diver's Reflections. Deep Sea Press, Nags Head, NC.

Burt, Richard, James Bradford, Bruce Dickson, Mark E. Everett, Robert Warden, David Woodcock

2009 Point-du-Hoc Battlefield, Normandy, France, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 383-397. Potomac Books Inc., Dulles, VA.

Butler, Scott

2008 *Battlefield Survey and Archeological Investigations at the Eutaw Springs, South Carolina Revolutionary War Battleground* (8 *September* 1781). The Flank Company, Atlanta, GA. GA2255-05-007

Cannell, Kevin G.

2005 *Archaeological Inventory of the Clearwater Battlefield*. Nez Perce Tribe Cultural Resource Program, Nez Perce, ID.

Carman, John and Patricia Carman

2009 Mustering Landscapes: What Historic Battlefields Share in Common, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 39-49. Potomac Books Inc., Dulles, VA.

Carr, Robert S., Mark Lance, and W.S. Steele

2002 *An Archaeological Assessment and Boundary Determination of the Okeechobee Battlefield, Okeechobee County, Florida*. Archaeological and Historical Conservancy, Miami, FL.

Carson-Drexler, Carl G.

2009 Finding battery positions at Wilson's Creek, Missouri, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 58-74. Potomac Books Inc., Dulles, VA.

Casserley, Tane, Nathan T. Richards, and Joseph C. Hoyt

2008 Battle of the Atlantic 2008 Expedition: Expedition Research Design. NOAA National Marine Sanctuaries, Newport News, VA.

Cheatham, James T.

1990 *The Atlantic Turkey Shoot: U-Boats off the Outer Banks in World War II*. Delmar

Printing Company, Charlotte, NC.

1994 The U-Boat War off the Outerbanks. In *To Die Gallantly: The Battle of the Atlantic*, Timothy J. Runyan and Jan M. Copes, editors, pp. 158-165.Westview Press, Boulder, CO.

Church, R., D. Warren, R. Cullimore, L. Johnson, W. Schroeder ,W. Patterson, T. Shirley, M. Kilgour, N. Morris, and J. Moore

2007 *A Study of Living History: Deep WWII Shipwrecks in the Gulf of Mexico.* PAST Foundation, Columbus, OH.

Cohn, Arthur B., Adam I. Kane, Christopher R. Sabick, Edwin R. Scollon, and Justin B. Clement

2007 *Valcour Bay Research Project: 1999-2004 Results From the Archaeological Investigation of a Revolutionary War Battlefield in Lake Champlain, Clinton County, New York-Final Report*. Lake Champlain Maritime Museum, Vergennes, VT.

Conlin, David L., and Matthew A. Russell

2006 Archaeology of a Naval Battlefield: *H.L. Hunley* and USS *Housatonic*. *The International Journal of Nautical Archaeology* 35(1): 20-40.

2011 Maritime Archaeology of Naval Battlefields in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. 39-56. Texas A&M University Press, College Station.

Cruse, J. Brett, Patricia Mercado-Allinger, Douglas D. Scott, and Pamela Folds

2000a *The Red River War Battle Sites Project, Phase 1*. Archeology Division, Texas Historical Commission, Austin.

2000b *The Red River War Battle Sites Project, Phase 2*. Archeology Division, Texas Historical Commission, Austin.

Cubbison, Douglas R., Lawrence S. Alexander, James Moore, and Charles R. Brown

1998 *Newtonia Battlefields Archaeological Survey*. Newtonia Battlefields Protection Association, Newtonia, MO.

Dasovitch, Steve and Walter Busch

2009 Fort Davidson Battlefield, Missouri, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 278-313. Potomac Books Inc., Dulles, VA.

Damp, Jonathan E.

2005 *The Battle of Hawikku: Archaeological Investigations of the Zuni-Coronado Encounter at Hawikku, the Ensuing Battle, and the Aftermath During the Summer of 1540*. Zuni Cultural Resource Enterprise, Zuni, NM.

Dautartas, Angela M., C. Clifford Boyd, Jr., and Rhett B. Herman, Robert C. Whisonant

2005 *A Research Design for the Investigation of the Battles of Saltville on October 2nd,* 1864, *and December 20th,* 1864. Radford University, Virginia. GA2255-04-007

Davis, W.C.

1975 *Duel between the first ironclads.* Stackpole Books: Mechanicsburg, PA.

Delgado, James P.

1996 *Ghost Fleet: The Sunken Ships of Bikini Atoll*. University of Hawaii Press, Honolulu.

Delgado, James P., Daniel J. Lenihan and Larry E. Murphy

1991 *The Archaeology of the Atomic Bomb: A submerged cultural resources assessment of the sunken fleet of Operation Crossroads at Bikini and Kwajalein Atoll Lagoons*. Southwest Cultural Resources Center Professional Papers No. 37. U.S. Department of the Interior, National Park Service, Santa Fe, NM.

DeRegnaucourt, Tony, and Barbara Meiring

2001 *A Report on the Archaeological and Historical Evaluation of the 1790's Historic Indian Battlefield, Fort and Camp Survey of Northwest Ohio*. Fort Recovery Historical Society, OH.

Dixon, Boyd, Robert Rogers, and Laura Acuna

2003 *Archaeological Investigation at the Resaca de la Palma Battlefield National Historic Landmark, Site 41CF3, City of Brownsville, Cameron County, Texas*. PBS&J, Austin, TX.

Eastern Sea Frontier (ESF)

1943 War Diary Eastern Sea Frontier, September. Records Relating to Naval Activity During World War II, World War II War Diaries, East Sea Fron Jun 42 to Sept 43, Records of the Office of the Chief of Naval Operations, box 335, Record Group 38, National Archives at College Park, College Park, MD.

Eckroth, David, and Harold Hagen

2004 *Baker's Battle on the Yellowstone, August 14, 1872*. Frontier Heritage Alliance, Billings,
MT.

Ellis, Daniel T.

2004 *Ebenezer Revolutionary War Headquarters: A Quest to Locate and Preserve.* The LAMAR Institute, Inc., Box Springs, GA.

2005a *Sansavilla Bluff: Survey at the Crossroads of the Colonial Georgia Frontier*. The LAMAR Institute, Inc., Box Springs, GA.

2005b *Sunbury Battlefield Survey*. The LAMAR Institute, Inc., Box Springs, GA.

Emerson, Stephen

2006 *Steptoe (Tohotonimme) Battlefield Survey*. Archaeological and Historical Services, Eastern Washington University, Cheney.

2008 *Walla Wall (Frenchtown) Battlefield Survey, Walla Walla County, Washington*.

Archaeological and Historical Services, Eastern Washington University, Cheney.

Farb, Roderick M.

1992 *Shipwrecks: Diving the Graveyard of the Atlantic* 2ed. Menasha Ridge Press, Birmingham, AL.

Foard, Glenn

2009 English battlefields 991-1685: A review of problems and potentials, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 133-159. Potomac Books Inc., Dulles, VA.

Frank, Wolfgang

1955 *The Sea Wolves: The complete story of German U-Boats at war,* Lt.Cmdr. R.O.B. Long, translator. Ballantine Books, New York, NY.

Fonzo, Stephen

2008 *A Documentary and Landscape Analysis of the Buckland Mills Battlefield (VA042).* Buckland Preservation Society, Gainesville, VA.

Freeman, Phillip

2011 History, archaeology, and the Battle of Balaclava (Crimea, 1854), in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. 149-164. Texas A&M University Press, College Station.

Freeman, Robert H. (editor)

1987 *War Diary: Eastern Sea Frontier: January to August 1942.* Shellback Press, Ventnor, NJ.

Fryman, Robert J.

1995 *Engaged the Enemy Again: An Assessment of the 1862 and 1864 Civil War Battlefields at Newtonia, Missouri*. Garrow & Associates, Inc., Atlanta, GA.

GAI Consultants, Inc., and Hardlines Design Company

2007 *Fort Ethan Allen Cultural Landscape Documentation Report, Arlington, Virginia.* GAl Consultants, Inc., and Hardlines Design Company, Homestead, PA. GA-2255-05-001

Galecki, Brian

2005 *Rum Runners, U-Boats, & Hurricanes*: *The Complete History of the Coast Guard Cutters Bedloe and Jackson.* Pine Belt Publishing, Wilmington, NC.

Gannon, Michael

1990 *Operation Drumbeat: The Dramatic True Story of Germany's First U-Boat Attacks Along the American Coast in World War II*. Harper & Row Publishers, New York, NY.

1998 *Black May: The Epic Story of the Allies' Defeat of the German U-boats in May 1943*. Harper Collins, New York, NY.

Gibson, Charles Dana

1986 *Merchantman? Or Ship of War*. Ensign Press, Camdem, ME.

Gould, Richard A.

1990 *Recovering the Past.* University of New Mexico Press, Albuquerque.

Geier, Clarence R., Lawrence E. Babits, Douglas D. Scott, and David G. Orr

2011 " 'The time has come' theWalrus said, 'To talk of many things …' " in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. vii-ix. Texas A&M University Press, College Station.

Gentile, Gary

1989 *Track of the Grey Wolf: U-Boat Warfare on the U.S. Eastern Seaboard 1942-1945*. Avon Books, NY.

1992 *Shipwrecks of North Carolina from Hatteras Inlet South*. Gary Gentile Productions, Philadelphia, PA.

1993 *Shipwrecks of North Carolina from the Diamond Shoals North*. Gary Gentile Productions, Philadelphia, PA.

2006 *The Fuhrer's U-boats in American Waters*. Bellerophon Bookworks, Philadelphia, PA.

Graves, Michael W., Frank Cantelas, and Suzanne S. Finney

1999 *The Identification and Documentation of a Civil War Shipwreck thought to be Sunk by the CSS Shenandoah in April 1865*. Pohnpei State Historic Preservation Office, Pohnpei.

Green, Russell T.

2002 *The Devereaux Cove Vessel and the Penobscot Expedition of 1779: Historical and Archaeological Interpretation of Vessel Remains at Devereaux Cove, Stockton Springs, Maine*. Department of History, East Carolina University, Greenville, NC.

Greene, Jerome A.

1998 *Reconnaissance Survey of Indian-US Army Battlefields of the Northern Plains*. National Park Service, Cultural Resources and the National Register Program Services, Intermountain Support Office, Denver, CO.

Grove, Eric J. (editor)

1997 *The Defeat of the Enemy Attack on Shipping 1939-1945*. Ashgate Publishing Company, Brookfield, VT.

Haecker, Charles, Elizabeth A. Oster, Angélica Medrano Enríquez and Michael L. Elliot

2009 Indian resistance in New Spain: the 1541 AD battlefield of Peñol de Nochistlán, an exemplar of Indian resistance in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 174-192. Potomac Books Inc., Dulles, VA.

Haecker, Charles M.

2003 *An Historical Archaeological Perspective of the Battlefield of Palmito Ranch, The Last Conflict of the Great Rebellion*. Brownsville Community Foundation, Inc., Brownsville, TX.

Hague, Arnold

2000 *The Allied Convoy System 1939-1945: Its Organization, Defence and Operation*. Naval Institute Press, Annapolis, MD.

Hanna, William F.

2011 Geophysics: Some recommendations and applications, in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. 11-20. Texas A&M University Press, College Station.

Harwood, James M.

2001 *No Danger of Surrender, An Historical Archaeological Perspective of the Civil War Battle of Wilson's Wharf, Charles City County, Virginia*. The College of William and Mary, Williamsburg, VA.

Heckman, Elsa

2009 Battlefield viewsheds, or what the general saw: Lookout Mountain Battlefield, Chattanooga, Tennessee, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 75-83. Potomac Books Inc., Dulles, VA.

Hickam, Homer

1989 *Torpedo Junction: U-Boat War off America's East Coast, 1942*. United States Naval Institute, Annapolis, MD.

Holtzer, H., and T. Mulligan (editors)

2006 *The Battle of Hampton Roads: New perspectives on the USS* Monitor *and CSS* Virginia. Fordham University Press, New York, NY.

Howarth, Stephen, and Derek Law (editors)

1994 *The Battle of the Atlantic 1939-1945: The 50th Anniversary International Naval Conference*. Naval Institute Press, Annapolis, MD.

Hoyt, Edwin P.

1978 *U-Boats Offshore: When Hitler Struck America*. Stein and Day, Briarcliff Manor, NY.

1984 *The U-Boat Wars*. Arbor House, New York, NY.

1987 *U-Boats*. McGraw-Hill Book Company, New York.

Hoyt, Joseph C.

2009 Final Project Instructions for 2009 'Battle of the Atlantic' Remote Sensing Expedition (Cruise Number: NF-09-12, August 4-9, 2009). Proposal to NOAA Marine Operations Center-Atlantic, Manuscript on file.

2010 Battle of the Atlantic Research Expedition 2010 (8 June – 30 June): Archaeological Survey and Operations Plan. NOAA National Marine Sanctuaries, Newport News, VA.

Hughes, Terry, and John Costello

1977 *The Battle of the Atlantic.* The Dial Press/James Wade, New York, NY.

Hunter, James W. III

2004 The Phinney Site: The remains of an American armed vessel scuttled during the Penobscot Expedition of 1779. *International Journal of Nautical Archaeology* 33(1):67-78.

Ireland, Bernard

2003 *Battle of the Atlantic*. Naval Institute Press, Annapolis MD.

Jaeger Company

2004 *Atlanta Campaign Historic Resources Survey Phase I*. Historic Preservation Division, Georgia Department of Natural Resources, Atlanta.

Jeffery, William

2004 World War II underwater cultural heritage sites in Truk Lagoon: considering a case for World Heritage listing. *International Journal of Nautical Archaeology* 33(1):106-121.

Johnson, David M.

2009 Apache victory against the U.S. Dragoons, the Battled of Cieneguilla, New Mexico, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 235-254. Potomac Books Inc., Dulles, VA.

Johnson, David M., and Chris Adams

2004 *The Battle of Cieneguilla: A Jicarilla Apache Victory over the United States Dragoons Near Taos, New Mexico, March 30, 1854*. Carson National Forest/Lincoln National Forest, NM.

Johnson, Matthew

2007 *Ideas of landscape.* Blackwell Publishing, Oxford, United Kingdom.

Kaplan, Philip, and Jack Currie

1997 *Wolfpack: U-Boats at War 1939-1945*. Naval Institute Press, Annapolis, MD.

1998 *Convoy: Merchant Sailors at War 1939-1945*. Naval Institute Press, Annapolis, MD.

Kemp, Paul

1997 *U-Boats Destroyed: German Submarine Losses in the World Wars*. Naval Institute Press, Annapolis, MD.

Kenny, Kathleen M. and John G. Crock.

2010 *Historical Survey, Property Survey, and ABPP Documentation Project, Hubbardton, Rutland County, Vermont.* Consulting Archeology Program, University of Vermont. GA-2255-08-028

Kloske, John

2010 WW2 hazardous wreck surveys, SRI proposal for research 10-MAROPS-01. Proposal for NOAA's Monitor National Marine Sanctuary, on file at Monitor National Marine Sanctuary, Newport News, VA.

Kozak, C.

2004 Scuba diving thieves plunder rare unspoiled WWII submarine wreck *U-701. Virginia Pilot,* 8 September 2004.

Lawhon, Katie

2002 Gettysburg the Way the Soldiers Saw it in 1863. *Cultural Resource Management (CRM)* 4:36-39.

LaLande, Jeff

2004 *Report on an Archaeological Survey of the Wheeler Ridge 1942 Japanese Aerial-Bombing Site*. Rogue River-Siskiyou National Forest, Medford, OR.

Legg, James B. and Steven D. Smith

2009 Salvaging data from a heavily collected battlefield, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 208-234. Potomac Books Inc., Dulles, VA.

Legg, James B., Steven D. Smith, and Tamara S. Wilson

2005 *Understanding Camden: The Revolutionary War Battle of Camden As Revealed Through Historical, Archaeological, and Private Collections Analysis*. South Carolina Institute of Archaeology and Anthropology, Columbia.

Lowe, David W., compiler

2000 *Battlefield Survey: American Battlefield Protection Program.* Unpublished manuscript, American Battlefield Protection Program, National Park Service.

MacIntyre, Donald

1961 *The Battle of the Atlantic*. BT. Batsford Ltd. London.

1971 *The Naval War Against Hitler*. Charles Scribner's Sons, New York, NY.

Mandry, Adrian

2009 Tatar, Cossacks, and the Polish Army: The battle of Zboriv, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 193-207. Potomac Books Inc., Dulles, VA.

Mangum, Douglas G. and Roger G. Moore

2010 *Archeological Investigations at the NRG Property, Harris County, Texas*. Moore Archeological Consulting, Inc.GA-2255-06-008

Martin, Colin and G. Parker

1999 *The Spanish Armada.* W.W. Norton, New York, NY.

McBride, Kevin.

2009 *Research Design, Site Identification and Documentation, Battle of Mystic Fort.* Mashantucket Pequot Museum and Research Center. GA-2255-07-011

McBride, W. Stephen and Kim A. McBride

2011 Methods in archaeology of colonial frontier forts: Examples from Virginia and West Virginia in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. 123-133. Texas A&M University Press, College Station.

McBride, Kevin and David Naumee.

2009a *Battle ofMystic Fort Documentation Plan.* Mashantucket Pequot Museum and Research Center. GA-2255-07-0112009b *Final Program Performance Report "Battle ofMystic Fort Documentation Plan.* Mashantucket Pequot Museum and Research Center. GA-2255-07-0112009c *Technical Report "Battle ofMystic Fort Documentation Plan.* Mashantucket Pequot Museum and Research Center. GA-2255-07-011

Miller, David

2000 *U-Boats: The Illustrated History of the Raiders of the Deep*. Brassey's, Washington, DC.

Miller, Orloff, and Rita Walsh

1995 *Preservation Plan and Archaeological Surface for Big Blue (Byram's Ford) Battlefield, Jackson County, Missouri*. Gray and Pape, Cincinnati, OH.

Morison, Samuel Eliot

1947 *History of United States Naval Operations in World War II,* vol. 1, *The Battle of the Atlantic: September 1939-May 1943*. Brown Little, Boston, MA.

National Oceanic and Atmospheric Administration (NOAA)

2008 Battle of the Atlantic Expedition. National Oceanic and Atmospheric Administration‘s National Marine Sanctuaries < http://sanctuaries.noaa.gov/missions/battleoftheatlantic/>. Accessed 20 October 2010.

2009 Battle of the Atlantic Expedition. National Oceanic and Atmospheric Administration‘s National Marine Sanctuaries < http://sanctuaries.noaa.gov/missions/battleoftheatlantic2/welcome.html>. Accessed 20 October 2010.

2010 Battle of the Atlantic Expedition. National Oceanic and Atmospheric Administration’s National Marine Sancturaries < http://sanctuaries.noaa.gov/missions/ 2010battleoftheatlantic/welcome.html>. Accessed 20 October 2010.

O’Dell, Kevin C., and James Powers

2008 *Final Technical Report (Pubic Version): Archaeological Investigations at Fetterman Battlefield (48SH127), Sheridan County, Wyoming*. ACR Consultants, Inc., Sheridan WY.

Olson, Chris

1995 Investigations of the CSS *Curlew*: A victim of the Battle of Roanoke Island, North Carolina. In *Underwater Archaeology: Proceedings from the Conference on Underwater and Historical Archaeology*, P.F. Johnson, editor, pp. 28-33. Washington D.C.

Outlaw, Alain C., Robert A. Selig, and Mary B. Clemons

2010 *Investigations of the Spencer's Ordinary* (26 *June* 1781) *and Green Spring Battlefields* (6 *July* 1781), *James City County, Virginia.* Archeological and Cultural Solutions, Inc., Williamsburg, Virginia. GA 2255-08-009.

Palmer, Michael A.

2007 *Command at sea: Naval command and control since the sixteenth century*. Harvard University Press, Cambridge, MA.

Panamerican Consultants, Inc.

2006 *Archaeology of the Civil War Naval Operations on the Ogeechee River, Georgia*. Panamerican Consultants, Inc., Memphis, TN.

Papatheodorou, G., M. Geraga and G. Ferentinos

2005 The Navarino Naval Battle Site, Greece—an integrated remote-sensing survey and a rational management approach. *International Journal of Nautical Archaeology* 34(1):95-109.

Peebles, M.D.

1995 CSS *Raleigh:* The history and archaeology of a Confederate ironclad in the Cape Fear River. In *Underwater Archaeology: Proceedings from the Conference on Underwater and Historical Archaeology*, P.F. Johnson, editor, pp. 20-27. Washington D.C.

Prange, G.W.

1986 *Pearl Harbor: The verdict of history.* McGraw-Hill, New York, NY.

Pratt, G. Michael

2000 *The Battle of Buffington Island: The End of Morgan's Trail*. Center for Historic and Military Archaeology, Tiffin, OH.

2009 How do you know it's a battlefield?, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 5-38. Potomac Books Inc., Dulles, VA.

Pratt, G. Michael, and William E. Rutter

2007 *Archaeological Assessment of Selected Areas of the River Raisin Battlefield, Monroe, Michigan*. The Mannik & Smith Group, Inc., Maumee, OH.

Pratt, G. Michael, William E. Rutter, and Richard Green

2010 *The River Raisin Battlefield: Outside the Core, Archeological Survey of Peripheral Battlefield Areas.* Center for Historic al1d Military Archeology, Heidelberg University, Tiffin Ohio - Historic Archeological Research, Inc., West Lafayette, Indiana. GA 2255-08-008

Pratt, G. Michael, William E. Rutter, Theodore Ligibel, and Jeffrey Green

2007 *The River Raisin Battlefield- Outside the Core: Identification and Threat.* Center of Historic and Military Archaeology, Heidelberg University, Tiffin, Ohio. GA-2225-07-010

Pollard, Tony

2011 Dissecting seventeenth- and eighteenth-century battlefields: Two case studies from the Jacobite rebellions in Scotland in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. 99-111. Texas A&M University Press, College Station.

Reeves, Matthews, Mark A. Trickett

2009 *Landscape Inventory of Civil War Sites in the "North Woods* JJ, *James Madison's Montpelier and Cultural Resource Management Plan for their Preservation.* GA-2255-08-012

Reuwer, David, and Scott Butler

2000 *Archaeological Investigations at the Eutaw Springs Revolutionary War Battlefield (38OR219), Orangeburg County, South Carolina*. Restore America's Revolutionary Era (RARE), Sumter, SC, and Brockington and Associates, Inc., Atlanta GA.

Richards, Nathan T. and Tom Allen

2009 The Battle of the Atlantic: an Archaeological Site Management and Environmental Risk Assessment Proposal. Proposal to the Coastal Maritime Council, East Carolina University.

Riess, Warren and G. Daniel

1997 Evaluation of preservation efforts for the Revolutionary War privateer *Defence. International Journal of Nautical Archaeology* 26(4):330-38.

Rodgers, Bradley A., Wendy Coble and Hans Van Tilburg

1998 The lost PBYs of Kaneohe Bay, Archaeology of the first casualties of Pearl Harbor. *Historical Archaeology* 32(4):4-16.

Rost, Achim

2009 Characteristics of ancient battlefields: The battle of Varus (9 AD), in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 50-57. Potomac Books Inc., Dulles, VA.

Sands, J.O.

1983 *Yorktown's Captive Fleet.* University Press of Virginia, Charlottesville.

1988 Gunboats and warships of the American Revolution. In *Ships and Shipwrecks of the Americas: A history based on underwater archaeology,* George F. Bass, editor, pp. 143-68. Thames and Hudson, London, United Kingdom.

Scheina, Robert L.

1982 *U.S. Coast Guard Cutters and Craft of World War II.* Naval Institute Press, Annapolis, MD.

Scott, Douglas D.

2011 Military medicine in the pre-modern era: Using forensic techniques in archaeological investigations to investigate military remains in *Historical Archaeology of Military Sites*, Clarence R. Geier, Lawrence E. Babits, Douglas D. Scott and David Orr, editors, pp. 21-29. Texas A&M University Press, College Station.

Scott, Douglas and Lucien Haag

2009 "Listen to the minié balls": Identifying firearms in battlefield archaeology, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 102-120. Potomac Books Inc., Dulles, VA.

Scott, Douglas, Lawrence E. Babits, and Charles Haecker (editors)

2009a Introduction, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War*, pp. 1-4. Potomac Books Inc., Dulles, VA.

2009b Conclusion: Toward a unified view of the archaeology of fields of conflict, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War*, pp. 429-438. Potomac Books Inc., Dulles, VA.

Scott, Douglas, Richard A. Fox, Jr., Melissa A. Connor, and Dick Harmon

1989 *Archaeological perspectives on the Battle of Little Bighorn*. Oklahoma University Press, Norman.

Showell, Jak Mallmann

2002 *U-Boat Warfare: The Evolution of the Wolf Pack*. Naval Institute Press, Annapolis, MD.

2006 *The U-Boat Century: German Submarine Warfare 1906-2006*. Naval Institute Press, Annapolis, MD.

Seibel, Scott, Terri Russ, and Matt Postlewaite

2008 *Archeological and King's Grant Research for the Battle ofBlack Mingo.* Environmental Services, Inc. Raleigh, North Carolina. GA-2255-08-004

Silverstein, Jay, John Byrd, and Lyle Otineru

2009 Hill 209: The last stand of Operation Manchy, Korea, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 417-428. Potomac Books Inc., Dulles, VA.

Sivilich, Daniel M.

2009 What the musketball can tell: Monmouth Battlefield State Park, New Jersey, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 84-101. Potomac Books Inc., Dulles, VA.

Smith, Steven D., James B. Legg, Mark J. Brooks, and Tamara S. Wilson

2009 *Archaeological Investigations on Little Folly Island.* South Carolina Institute of Archaeology and Anthropology, Columbia.

Spirek, James D.

1993 The USS *Southfield*: An historical and archaeological investigation of a converted gunboat. Master's Thesis, Department of History, East Carolina University, Greenville, NC.

Standard Oil Company

1946 *Ships of the Esso Fleet in World War II*. Standard Oil Company, New Jersey.

Stick, David

1952 *Graveyard of the Atlantic: Shipwrecks of the North Carolina Coast*. The University of North Carolina Press, Chapel Hill.

Sutherland, Tim, and Simon Richardson

2009 Arrows point to mass graves: Finding the dead from the battle of Towton, 1461AD, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to*

the Korean War, Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 160-173. Potomac Books Inc., Dulles, VA.

Strezewski, Michael, James R. Jones III, and Dorothea McCullough

2006 *Archaeological Investigations at Site 12-T-59 and Two Other Locations in Prophetstown State Park, Tippecanoe County, Indiana.* Indiana University, Perdue, University at Fort Wayne, Fort Wayne. GA-2255-04-004

Stull, Scott D.

2008 *Archeological Investigation Draft Report: Fort Hardy and the Field of Grounded Arms, Town of Saratoga, Saratoga County, New York (HAA-3425).* Hartgen Archeological Associates, Inc., Rensselaer, New York. GA-2255-04-010

Sutherland, Tim and Simon Richardson.

2009 Arrows point to mass graves: Finding the dead from the battle of Towton, 1461AD, in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 160-173. Potomac Books Inc., Dulles, VA.

Syrett, David

1994 *The Defeat of the German U-Boats: The Battle of the Atlantic*. University of South Carolina Press, Columbia.

Tankersley, Wm. Matthew, and Chris Espenshade

2007 *Archaeological Survey of the Battle of Brown's Mill, Coweta County, Georgia*. New South Associates, Stone Mountain, GA.

United States Coast Guard (USCG)

1942 *Triton* (WPC-116) Deck Logs 1942, Logbooks, Record Group 26, National Archives Building, Washington, DC.

United States Navy (USN)

1942a *Ellis* (DD-154) Deck Logs March 1942 to September 1942, Box 3085, Deck Logs 1941-1950, Record Group 24, National Archives at College Park, College Park, MD.

1942b *McCormick* (DD-223) Deck Logs July 1941 to September 1942, Box 5689, Deck Logs 1941-1950, Record Group 24, National Archives at College Park, College Park, MD.

1942c *Spry* (PG-64) Deck Logs May 2, 1942 to October 1943, Box 8501, Deck Logs 1941-1950, Record Group 24, National Archives at College Park, College Park, MD.

University of Hawaii at Manoa

2002 *Submerged Cultural Resources Survey of Kane'ohe Bay*. University of Hawaii, Manoa.

Veyrat, E. and M. L'Hour

1994 The wrecks of the Battle of La Hougue (1692): evidence of French shipbuilding in the Royal Dockyards. In *Underwater Archaeology: Proceedings from the Conference on Underwater and Historical Archaeology*, R.P. Woodward and C.D. Moore, editors, pp. 25-31. Vancouver, British Columbia.

Wagner, John

2010 Waves of Carnage: A Historical, Archaeological, and Geographical Study of the World War II Battle of the Atlantic in North Carolina Waters. Master's thesis, Department of History, East Carolina University, Greenville, NC.

Watson, Bruce Allen

2006 *Atlantic Convoys and Nazi Raiders: The Deadly Voyage of HMS* Jervis Bay. Praeger, Westport, CT.

Watts, Gordon P.

1998 *Mobile Bay Shipwreck Survey, Investigation and Assessment of Civil War Shipwrecks off Fort Morgan Point, Mobile, Alabama*. East Carolina University, Greenville, NC.

Watts, Gordon P. and Richard W. Lawrence

2003 *An Investigation and Assessment of Civil War Shipwrecks off Fort Fisher, North Carolina*. East Carolina University, Greenville, NC.

Weintraub, S.

1991 *Long day's journey into war: December 7, 1941.* Dutton, New York, NY.

Westwood, David

2003 *Anatomy of the Ship: The Type VII U-Boat*. Naval Institute Press, Annapolis, MD.

Whisonant, Robert C., C. Clifford Boyd, Jr., and Rhett B. Herman

2007 *The Civil War Battles for Saltville: Inventory and Assessment of Battlefield Resources Using GIS/GPS Technology.* Departments of Geology, Sociology and Anthropology, Radford, Virginia. GA-2255-04-007

White, David Fairbank

2006 *Bitter Ocean: The Battle of the Atlantic 1939-1945*. Simon & Schuster, New York, NY.

Wiggins, Melanie

1999 *U-Boat Adventures: Firsthand Accounts from World War II*. Naval Institute Press, Annapolis, MD.

Wilbers-Rost, Susanne

2009 Total Roman defeat at the Battle of Varus (9AD), in *Fields of Conflict: Battlefield Archaeology from the Roman Empire to the Korean War,* Douglas Scott, Lawrence E. Babits and Charles Haecker, editors, pp. 121-132. Potomac Books Inc., Dulles, VA.

Williams, Andrew

2003 *The Battle of the Atlantic: Hitler's Gray Wolves of the Sea and the Allies' Desperate Struggle to Defeat Them*. Basic Books, New York, NY.

Williamson, Gordon

2010 *U-boat Tactics in World War II*. Osprey Publishing, Long Island City, NY.

Willoughby, Malcolm F.

1957 *The U.S. Coast Guard in World War II.* United States Naval Institute. Revised and reprinted 1989 by Naval Institute Press, Annapolis, MD.