

Maryland Collaborative Archaeological Survey



**US Department of the Interior
Bureau of Ocean Energy Management
Office of Renewable Energy Programs**



**US Department of Commerce
National Oceanic and Atmospheric
Administration
Office of National Marine Sanctuaries**

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Authors

Brandi Carrier
William Hoffman
Joseph Hoyt
Will Sassorossi

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BOEM's Office of Renewable Energy Programs
45600 Woodland Road, Sterling, VA 20160

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NOAA's Office of National Marine Sanctuaries
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DISCLAIMER

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ACKNOWLEDGEMENTS

The field project affectionately known as “M-CAS” represents the third in a series of successful research studies conducted by the Bureau of Ocean Energy Management (BOEM) and the National Oceanic and Atmospheric Administration’s (NOAA) Monitor National Marine Sanctuary, among others. It follows a model tested and vetted offshore the State of Massachusetts – as reported in *Collaborative Archaeological Investigations and Sound Source Verifications within the Massachusetts Wind Energy Area* (available at <http://www.boem.gov/Collaborative-Archaeological-Investigations-and-Sound-Source-Verifications-Final/>) – and the Commonwealth of Virginia – as reported in *Virginia Collaborative Archaeological Survey* (available at <http://www.boem.gov/VCAS-Report>).

These field studies are designed to ground-truth archaeological sites to support the environmentally-responsible development of renewable energy on the Outer Continental Shelf. Moreover, this model relies upon Federal and state agencies, university partners, and others to work together toward this common goal. Like its predecessor studies, the Maryland Collaborative Archaeological Survey is the result of the concerted efforts of many individuals and organizations who brought to the project the necessary instruments, field equipment, dive operations support, and knowledge to ensure a safe, successful field season. Without committed individuals and their contributions, none of these studies would have been possible.

The authors wish especially to acknowledge Dave Sybert and John McCord of the University of North Carolina Coastal Studies Institute for photography and videography; Jason Nunn of East Carolina University and Tane Casserley of NOAA for dive safety and logistics; Christopher Horrell of the Bureau of Safety and Environmental Enforcement for providing access to and training field personnel in the use of the sector scanning sonar; Josh Wadlington of BOEM for GIS analysis and assistance with preparation of maps and graphics; and Pasquale DeRosa and Scott Sinclair of Cardinal Point Captains for ensuring operational safety and efficient vessel logistics.

INTRODUCTION

With the passage of the Energy Policy Act of 2005, the Bureau of Ocean Energy Management (BOEM) acquired responsibilities for regulating renewable energy activities on the Outer Continental Shelf (OCS), including wind energy. As part of this responsibility, BOEM conducts detailed environmental analyses of projects proposed for development. The potential direct, indirect, and cumulative impacts on the human, coastal and marine environments must be evaluated in order for BOEM to make environmentally sound decisions about managing renewable energy activities and developing mitigation measures to avoid or minimize impacts.

BOEM has a need for baseline data within wind energy planning and lease areas in order to make sound decisions about how to minimize impacts, to form post-construction comparisons during monitoring of environmental changes that might be discernable later, and to meet its responsibilities under Sections 106; 110(a)(2)(A), (B), (C), and (E); and 110(b) of the National Historic Preservation Act (NHPA). Previously identified geophysical targets (side scan sonar contacts and magnetic anomalies) in these areas may prove to be archaeological resources that should be avoided, or they may prove *not* to be resources and therefore should not prevent development. Archaeological ground-truthing of these targets is necessary for informed, responsible decision-making and to consider the effects of BOEM's undertakings subject to review under the National Historic Preservation Act.

During summer 2013 the State of Maryland contracted with Coastal Planning & Engineering, Inc. and Tidewater Atlantic Research Inc. to conduct a reconnaissance-level geophysical survey within the Maryland Wind Energy Area (MD WEA) and to complete a preliminary archaeological review of the survey data (Coastal Planning & Engineering Inc. 2014; Watts 2014). In 2015, BOEM invited NOAA to collaborate on this current investigation and together the agencies leveraged the results of the reconnaissance-level survey to develop and execute an archaeological investigation to gather baseline information regarding potential archaeological sites within the MD WEA (Figure 1).

NOAA provided scientific and technical advice and services, shared resources, and assisted BOEM with conducting and analyzing the resulting data. BOEM and its sister agency, the Bureau of Safety and Environmental Enforcement (BSEE), contributed scientific personnel, equipment, and resources. This afforded both BOEM and NOAA a unique opportunity to share equipment and expertise for mutual benefit. BOEM and NOAA jointly finalized a research design, collaboratively performed the survey and investigations, analyzed results, and produced this joint report.

BOEM's overarching strategic goal is to achieve expeditious and orderly development of energy resources, while minimizing impacts on the environment and developing and employing sound science and partnerships. BOEM unites its need to gather baseline data with efforts to leverage partnerships with other Federal agencies, state agencies, universities, and tribal governments. Doing so creates efficiencies in BOEM's processes; reduces expenditures; builds relationships that will extend these efficiencies and cost reductions into the future; and provides needed data to inform present, sound decision-making.

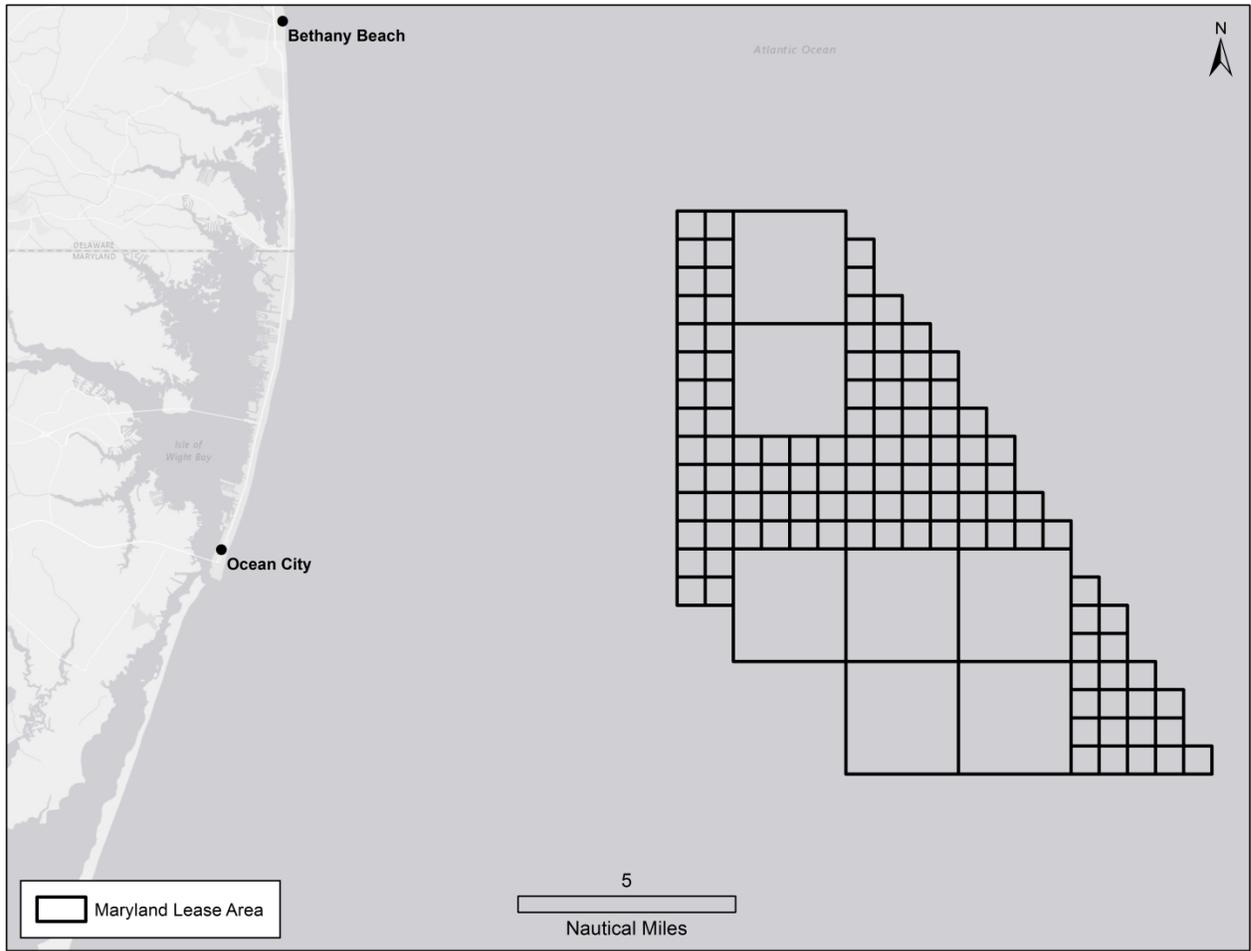


Figure 1. Maryland Wind Energy Area.

This report presents the results of an archaeological investigation of selected survey areas near and within the MD WEA. The Introduction includes sections discussing objectives of the study, the research design prepared to guide the study tasks, scope and limitations of the study, and personnel participating in the project. The Methods section includes discussion of methods employed for both target prioritization activities, as well as the field investigations undertaken. The Results section includes findings for eight survey areas selected as priority for the investigation. Finally, the Conclusions and Recommendations section provides detailed management recommendations for each priority area.

A single technical appendix was prepared to supplement this report. It contains sensitive information pertaining to the locations of archaeological resources investigated and their relationships to entries in BOEM's Atlantic Shipwreck Database (ASD). In order to protect the locations of sensitive archaeological resources, it is not included in the publically-available version.

Objectives

Research objectives of the investigation focused on obtaining preliminary baseline archaeological data near and within the MD WEA in order to inform future decision-making. Specifically, objectives included ground-truthing, via geophysical survey and diver investigation, potential targets of archaeological interest that had been identified through previous reconnaissance-level survey conducted by Coastal Planning & Engineering, Inc. and archaeological analysis by Tidewater Atlantic Research Inc. (Coastal Planning & Engineering, Inc. 2014; Watts 2014).

Research Design

The research design identified several tasks to achieve these objectives. Where possible, these included:

1. Collect high resolution sidescan sonar and/or sector scanning sonar imagery of each priority target;
2. If warranted, based on the results of the remote sensing data, conduct diver investigation of the targets;
3. Complete a rapid assessment, exterior survey of each confirmed archaeological resource;
4. As conditions allow, produce a cursory site map (or photomosaic) of each archaeological resource for interpretation and as a representation for use in potential follow-up inquiry;
5. Complete detailed video and photographic surveys of confirmed archaeological resources;
6. Identify to what degree archaeological site preservation is influenced by environmental conditions, site formation processes and anthropogenic impacts (e.g. determine whether the site has been subject to post-deposition looting or disturbance due to trawling or other activities);
7. Assess the historical significance and archaeological integrity of each confirmed archaeological resource;
8. Determine whether or not the archaeological resource warrants further investigation;
9. If possible, determine if any confirmed archaeological resource possesses the characteristics of significance making it eligible for listing on the National Register of Historic Places (NRHP).

In order to achieve these objectives, the survey methods were designed to recover data that would potentially identify each archaeological resource, and contribute to consideration of its eligibility for listing in the NRHP.

Scope and Limitations

The research design provided detailed boundaries for the scope of the project. This project was not designed to be a completely comprehensive investigation, and should be viewed as a preliminary baseline assessment upon which future research can be founded, if deemed appropriate by BOEM or NOAA. Without this baseline information it is difficult to know what questions to ask because the archaeological resource is generally undefined until this type of

survey is completed. As such, the questions posed in this project are of a general nature with the intent to provide a foundation for formulating future research.

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 weather and sea state conditions off Maryland vary, predicted days of inactivity are built-in, and personnel process the collected data sets during this time. This particular survey enjoyed relatively favorable weather conditions, with data collection hampered at times and the result of one full weather day; however, this did not prohibit the investigation of each of the intended targets.

Additionally, certain site locations also pose limitations underwater. High and variable currents may be present, and visibility may range from zero to more than 15 meters (m; 50 feet [ft]). These factors produce differing degrees of in-water efficiency from day-to-day. Furthermore, the depth of the sites, ranging from 21 to 30 m (70 to 100 ft), greatly limits the amount of time that can be spent on-site each day. While currents and sea-state were generally mild on this project, many sites did encounter poor but workable visibility, as evidenced in the photographs.

Finally, survey was limited only to exterior observations of archaeological sites. In addition, the research team did not conduct any exterior work that would impact or disturb the site in any way. This precluded establishing permanent baselines or removing or manipulating anything on-site.

Personnel and Roles

The following individuals participated in the MCAS investigation:

1. Brandi Carrier – BOEM: Co-Principal Investigator
2. William Hoffman – BOEM: Co-Principal Investigator
3. Brian Jordan – BOEM: Maritime Archaeologist
4. Chris Horrell – BSEE: Maritime Archaeologist
5. Joseph Hoyt – NOAA: Co-Principal Investigator
6. Will Sassorossi – NOAA: Co-Principal Investigator
7. Tane Casserley – NOAA: Maritime Archaeologist
8. Kara Davis – NOAA: Maritime Archaeologist
9. Lingsh Nquyen – NOAA: Vessel Crew
10. Jason Nunn – CSI/ECU: Diving Safety and Logistics
11. John McCord – CSI: Photo and Video
12. Dave Sybert – CSI: Photo and Video
13. Scott Sinclair – Mate
14. Pasquale DeRosa – Captain

METHODS

The Maryland Collaborative Archaeological Survey (MCAS) was conducted from 6 through 17 July 2015. Designed as an archaeological investigation cruise, the survey collected acoustic data and ground-truthed selected geophysical targets with archaeological potential located within and near the MD WEA. Field operations consisted of at-sea operations from NOAA's SRVx *Sand Tiger* platform, a 26-m (85-ft) research vessel that provided berthing for crew; provided the platform for high-resolution side-scan sonar and sector scanning survey of anomalies; and served as the platform for diving operations. Field operations consisted of joint BOEM/NOAA diving operations appropriate to the area of investigation including recording observations, photography, and videography. Finally, BOEM and NOAA held a joint dockside public engagement event on 18 July aboard the NOAA vessel in Ocean City, MD.

Target Prioritization

This project focused on gaining higher resolution acoustic data and ground-truthing targets originally acquired during a lower-resolution, reconnaissance-level geophysical survey of the MD WEA (Watts 2014). The previously collected survey data and recommendations from the preliminary archaeological assessment were analyzed by the project archaeologists to prioritize anomaly investigations. This assessment included review of the length, size of acoustic shadow and reflectivity of side scan sonar targets. The intensity, duration and signature of magnetic anomalies were reviewed for evidence regarding the presence of potential archaeological resources. While the project attempted to assess as many targets as possible, priority was given to anomalies identified during the original survey that indicated the presence of shipwreck remains, followed by the ranking of clusters of remote sensing targets co-located with entries in BOEM's ASD and also located in the vicinity of obstructions and potential vessel remains identified on NOAA charts.

The ranking procedure was based on geospatial analysis of co-location of side scan sonar targets, magnetic anomalies, and ASD entries, with the understanding that certain limitations apply to these datasets. The regional-scale survey was conducted at a 150 m (492 ft) line spacing, wholly insufficient for identifying archaeological resources that may lie between survey lines. Therefore, lack of a corresponding magnetic anomaly does not mean that no ferromagnetic materials are associated with a sonar target. Moreover, the ASD is comprised of many sources of data, some that were obtained when locational accuracy of navigational equipment was far less reliable and/or circumstances surrounding a loss would have significantly reduced locational accuracy by the reporting entities. Even with the use of the ASD there is still a chance that evidence of cultural significance may be discovered that was unexpected, unknown or did not correlate with an originally expected location. Finally, the scale of the side scan sonar data was sufficient to yield 100% coverage of the seafloor, but not 200% overlapping coverage; thus the area of the nadir and the outer boundaries of the data are not well resolved. Additionally, the resolution utilized may inhibit identification of smaller archaeological resources. Based on analyses of available data, the following survey areas were prioritized for executing operations (Table 1). Cluster designations are named based on the most prevalent remote sensing target identified during the Coastal Planning & Engineering, Inc. survey (i.e. Cluster 34 correlates to side scan sonar Target 34 from the reconnaissance level survey). The clusters were then

designated as Survey Areas and ranked in priority from 1 through 8 to guide the field effort (Figure 2).

Table 1. Priority Survey Areas selected for Investigation.

Survey Area	Cluster	SSS Targets	ASD Entries	Mag Anomalies	Notes	Priority
1	034	2	4	Very large	Shipwreck evident in sonar imagery.	High
2	038	4	4	Large	Shipwreck evident in sonar imagery.	High
3	071	4	1	Large	Shipwreck evident in sonar imagery.	High
4	029	3	1	Large	Charted shipwreck debris with associated anomaly.	High
5	044	5	0	None	Charted shipwreck debris with no associated anomaly.	Medium
6	069	3	3	None	No charted remains, but good locational association.	Medium
7	085	1	2	None	Possible association with charted shipwreck debris.	Low
8	014	3	0	None	Outside of WEA; uncharted vessel remains.	Low

Archaeological Investigation

The methodology for investigating confirmed archaeological sites consisted primarily of documenting the site by generating acoustic imagery, rough site sketches, recording diagnostic hull features, intensive video and photo documentation, and documentation of artifacts in situ, if observed. Due to the dynamic environment of each site investigated and the nature of this non-invasive survey, permanent baselines were not established at the sites, though temporary tapes were carefully used by non-invasive means.

Divers were assigned specific tasks to document and record at each site. A photographic/video survey was conducted to document artifacts, ordnance, and diagnostic features of the site. The photographic/video documentation included, where possible, the outer hull structure, diagnostic structural features and any damage or degradation to the hull structure, as well as artifacts in situ. At no point during the survey was the hull structure or any feature of the resource altered. Diving operations were conducted in a ‘live boat’ mode. This method eliminated the need for anchoring and mitigates the possible impact of anchoring into an archaeological resource.

All survey goals were designed to recover data documenting the resource and to inform consideration of eligibility for listing on in the NRHP. The protocols followed on the project to accomplish these goals are outlined below.

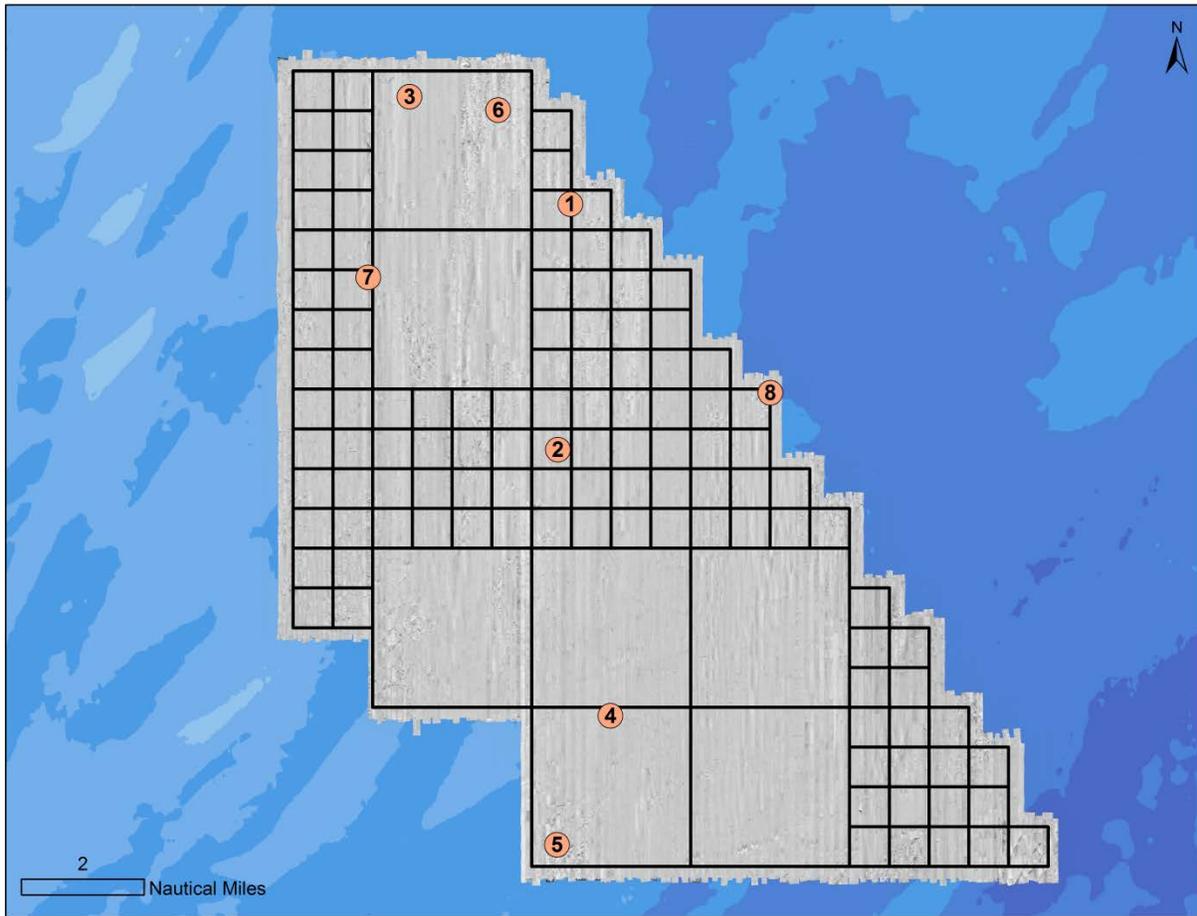


Figure 2. Survey Areas Prioritized for Investigation.

Remote Sensing Survey Protocols

1. Conduct targeted sidescan survey of priority targets.
 - a. Perform high-frequency 600khz acoustic surveys of each target with Klein 3000 sonar.
 - b. Post-process each survey to generate georectified acoustic imagery (.tfw).
2. Collect site imagery using Sector Scanning Sonar.
 - a. Collect targeted surveys of individual sites using a Kongsberg Mesotech 1000 sector scanning sonar.
 - b. Post-process sonar imagery of sites to best reflect site characteristics.

In-Water Documentation Protocols

1. Documentation of the sites by observing 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, if evident.
 - c. Identify and record hull damage caused to the sites post-sinking due to natural and/or man-made causes, if evident.
 - 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. As conditions allow: 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.
 - b. Conduct profile and oblique photo-mosaics surveys.
 - 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 visible on the seafloor, if present.

Site Assessment Protocols

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. Consider eligibility for listing in the NRHP.
 - e. Make suggestions for public interpretation.
2. Determine if remaining artifacts are visible and/or threatened.
 - a. Identify artifacts of historical significance or unique type.
 - b. 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.

The tasks listed above were designed to provide flexibility and adaptability based on the nature of the individual site under investigation and also for considering for factors beyond control (*e.g.* inclement weather, equipment breakdown, personal illness, poor visibility on the site, etc.). Dive tasks could require a single dive or multiple dives, but each task is related to a discrete objective.

RESULTS

From among the highest priority targets, eight Survey Areas comprising clusters of targets were chosen for further investigation. Clusters 034, 038, 071, 029, 044, 069, 085, and 014 were originally identified using available data from a regional-scale survey of the MD WEA (Watts 2014) and of entries held in BOEM's ASD (see Target Prioritization, above). Based on expected time available and level of recording desired, geographic location and distance between the targets, and forecasted weather conditions, it was estimated that these targets could be examined during two, three-to-four day deployments, beginning on 8 July 2015. Several targets from historic records and BOEM's ASD were incorporated within the clusters and necessitated further investigation, including suspected sites of *Washingtonian*, *W.L. Steed*, *H. Buoy Wreck* (barge), *Rocks*, *Elizabeth Palmer*, and *Avalon*.

Survey Area 1: Target 034

As originally identified, Survey Area 1 was comprised of two side scan sonar (SSS) targets (033 and 034) from the regional survey (Watts 2014) and four entries from the ASD, all of which are listed as vessels (Figure 3). Two magnetic anomalies also are co-located with the survey area, the strongest of which measured 12,283 nT in strength for a duration of 75 m (246 ft). The survey area measured 0.02 square km in area. The distance from the nearest ASD entry to Target 034 extended 54 m (177 ft).

There are two named vessels associated with this survey area, *Washingtonian* and *W.L. Steed*. *Washingtonian*, built with the original hull number 131, was a 6,547 ton steam freighter, measuring 124 m (407 ft) in length and 16 m (53 ft) at beam. Built in 1914 by Maryland Steel at Sparrow's Point, MD, the vessel was owned by the American-Hawaiian Steam Ship Company, of New York, NY. The American-Hawaiian Steam Ship Company was founded in 1899 to carry cargos of sugar from Hawaii to the United States in return for manufactured goods (Figure 4).

In January 1915, the vessel was returning with a large cargo of sugar from Hawaii. In the early morning hours on 26 January 1915, *Washingtonian* collided with the wooden schooner *Elizabeth Palmer*. *Elizabeth Palmer* struck *Washingtonian* on the starboard side, creating enough damage to sink the ship quickly. Quoted in the New York Times article the following day, "the American-Hawaiian Line's steamship *Washingtonian*, the largest freighter under the American flag, carrying nearly 10,000 tons of raw sugar worth about \$1,000,000, was sunk early yesterday morning by the American five masted schooner *Elizabeth Palmer* in a collision off Fenwick Island" (New York Times 1915; Figure 5). *Elizabeth Palmer* measured over 91 m (300 ft) in length and grossed 3,015 tons. The vessel was only carrying light cargo at the time of the collision.



Figure 3. Survey Area 1, comprised of regional survey Targets 033 and 034 and four entries from the ASD. Yellow dots represent ASD entries and green dots represent Targets 033 and 034.



Figure 4. SS *Washingtonian* by Unknown - W.B. Taylor collection, The Mariner's Museum, via Shomette, Donald (2007).

TWO BIG SHIPS SINK IN COLLISION AT SEA

Washingtonian, Largest American Freighter, and Schooner Elizabeth Palmer Go Down.

ONE MAN LOST; CREWS HERE

Steamship Cost a Million and Carried 10,000 Tons of Sugar—Sky Clear and Sea Calm at Time.

The American-Hawaiian Line's steamship *Washingtonian*, the largest freighter under the American flag, carrying nearly 10,000 tons of raw sugar worth about \$1,000,000, was sunk early yesterday morning by the American five-masted schooner *Elizabeth Palmer* in a collision off Fenwick Island, near Delaware Breakwater.

The steamship sank in ten minutes after the *Palmer* had hit her. Herman Meyer, a watertender, was missing after the *Washingtonian's* crew got away in the boats.

The schooner sank a little later to her topgallant bulwarks and her crew left in a motor lifeboat. Both of the rescued crews arrived here late yesterday on the Old Dominion steamship *Hamilton*. They had lost all their effects.

The financial loss due to the collision is estimated at \$2,125,000.

Capt. E. D. Brodhead of the *Washingtonian* was deeply affected by the loss of his ship, and would not see reporters who boarded the *Hamilton*. His officers and crew, numbering thirty-nine, refused to discuss the cause of the accident.

J. D. Tomlinson, Marine Superintendent of the American Hawaiian Line, after a talk with the Captain gave out the following statement on his behalf:

Capt. Brodhead's Statement.

"The *Washingtonian* steamed from Honolulu on Dec. 30 with a cargo of sugar and some merchandise. She was bound for the Delaware breakwater and reached Balboa on Jan. 17 and passed through the Panama Canal on Jan. 19. She had almost reached the breakwater when the collision occurred.

"The schooner *Elizabeth Palmer* of Portland, Maine, bound for Norfolk in light ballast, struck her on the starboard side and damaged her so badly that she sunk in ten minutes. Capt. E. D. Brodhead and thirty-nine men were saved, after being in their small boats for an hour or more, by the steamship *Hamilton* of the Old Dominion Line, and will be sent to their homes. A water tender named Meyer disappeared after the crash and has not been found. He was probably drowned.

"On the bridge at the time of the collision was Capt. Brodhead, two quarter-masters, and a sailor—the usual watch. The night was clear, with a slight haze over the water. Capt. Brodhead has been a master for four years, and has been with the Hawaiian-American Company a long time. He is considered an able navigator."

Capt. George A. Carlisle of Booth Bay Harbor, Me., who sailed the *Elizabeth Palmer*, said he was glad his crew of thirteen men, including Mrs. Andrews, the steward's wife, who acted as cook, had been saved. He had managed to save a few shirts and collars, which he carried in a pillow case.

When asked to tell of the collision Capt. Carlisle said:

Schooner Captain's Story.

"The *Elizabeth Palmer* sailed from Boston for Norfolk, flying light, to load with coal for Portland, Me. At 3:30 A. M. today we were bowling along a good eight knots with all possible drawing sail set, off Fenwick Island, just south of Delaware Breakwater.

"There was a fresh breeze from the northward and we were steering S. W. by W. while the *Washingtonian* was heading N. E. by N. in the opposite direction. The international rules of navigation say clearly that a steam vessel must keep out of the way of a vessel under sail at all times, and so I did not worry but kept my course.

"The steamship tried to cross the bows of the schooner, and her officers on the bridge did not apparently realize that we were going so fast as eight knots. The *Washingtonian* was making twelve knots, and in a few minutes the bow of the *Elizabeth Palmer* crashed into her starboard side, just abaft the beam, making a big hole.

What Happened at the Time.

"Our jibboom and foretopmast had gone, but I thought the schooner would keep afloat. By 4:30 A. M. I saw that the hull was going under water, so I ordered the hands into the motor lifeboat, and we went to the lifesaving station on Fenwick Island, about a mile and a half away. There we waited until the *Hamilton* arrived, just before 8 o'clock. The top of the rail could still be seen level with the water when we came away."

Capt. Carlisle said that the *Palmer* was worth \$125,000, and was owned by J. S. Winslow & Co. of Portland.

Meyer Last Seen on Deck.

The crew of the *Washingtonian* lowered two life boats safely in the bare ten minutes before she went to the bottom. Meyer, the watertender, was seen on deck by his shipmates when they were lowering the boats, but he was not to be found afterwards.

The *Washingtonian* was a new steamship, returning from her first voyage by way of the Panama Canal. The vessel cost \$1,000,000 and was finished a few months ago at Sparrows Point, Md. Her holds were equipped with a complete refrigerating plant to permit carrying salmon from the Oregon and Washington fisheries to the Eastern market.

The *Elizabeth Palmer* was one of the largest American sailing vessels. She was built in Bath, Me., in 1908. She was 390 feet 4 inches long and measured 3,015 gross tons.

Claus A. Spreckels, President of the Federal Sugar Refining Company, said last night, commenting on the accident:

"The loss of 10,000 tons of sugar would not ordinarily have any effect on sugar prices, but at present, conditions are by no means ordinary. The Cuban crop, upon which this country depends for its chief supply is about 200,000 tons behind last year in point of production, owing to rains."

"In addition, the scarcity of shipping room has recently become an important feature of the sugar market. Owing to the war, the world's supply of sugar is abnormally low, and we can ill afford to lose a single ton."

"Well-informed shipping interests say there is not sufficient tonnage available to take care of more than 40,000 tons a week of Cuban sugar, and this country will soon be demanding from 50,000 to 60,000 tons a week for its normal requirements, not to mention what will be needed by England and France."

The New York Times

Published: January 27, 1915
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Figure 5. New York Times article from 27 January 1915 describing the collision and sinking of *Washingtonian* and *Elizabeth Palmer* (New York Times 1915).

Within ten minutes of the collision *Washingtonian* sank, and a little over an hour later, the badly damaged and drifting *Elizabeth Palmer* sank as well. One crew member of *Washingtonian* was lost in the collision but the surviving crew of *Washingtonian* and *Elizabeth Palmer* were rescued and taken to New York, NY. The collision and subsequent ship and cargo losses, as noted in the New York Times, was noteworthy as, "the loss of 10,000 tons of sugar would not ordinarily have any effect on sugar prices, but at the present, conditions are by no means ordinary. The Cuban crop, upon which this country depends for its chief supply is about 200,000 tons behind last year in point of production, owing to rains" (New York Times 1915). The war in Europe also reduced the availability of commodities, such as sugar, and the result of the shipping incident greatly affected the prices for a time.

The second named shipwreck attributed to the survey area is *W. L. Steed*. The vessel was built in 1918 at Bethlehem Shipbuilding Corporation in Quincy, MA. Owned by Standard Oil of New Jersey at the time of its sinking, the oil tanker measured 126 m (416 ft) in length, 17 m (56 ft) at

beam, and had a gross tonnage of 6,182 tons (Lloyd's Register of Shipping 1942). In the first year of operation, *W. L. Steed* was assigned to the Naval Overseas Transportation Service, transporting oil to Europe until 1919 when the vessel was then decommissioned. Acquired by the Pan-American Petroleum and Transport Co. in 1922, *W. L. Steed* was subsequently acquired by the Standard Oil Company of New Jersey in 1937 (Naval History and Heritage Command 2015). *W. L. Steed* operated mostly coastal routes, transporting oil from the gulf to the east coast, but occasionally worked in the Caribbean, through the outbreak of U.S. involvement in World War II.

In mid-January 1942, *W. L. Steed* departed Cartagena, Columbia bound for New Jersey with a full cargo of crude oil, over 65,900 barrels. At the same time, German U-boat U-103, captained by Kapt. Werner Winter, was making its transatlantic voyage to American waters. On 2 February 1942, U-103 spotted *W. L. Steed* traveling approximately 100 miles from Ocean City, MD. The weather at the time was snowing and the seas unfavorable, however, Winter positioned U-103 to stalk the unsuspecting tanker. When ready, Winter ordered one torpedo to be fired at the vessel. As the conditions made it unable to track the torpedo, Winter watched the tanker itself, waiting anticipating an explosion. After a minute, the torpedo crashed and exploded into the starboard side, forward of the bridge, and at the #3 tank. The explosion ignited a fire in the oil drums stored there (Hickam 1989:34-35; Blair 1996:499; Naval History and Heritage Command 2015). U-103 continued to follow the vessel as it did not sink immediately.

Following the torpedo strike, the crew of *W. L. Steed* made their way to board four life boats. As they were loading the boats, U-103 surfaced and pulled up alongside the vessel to inspect the damage. *W. L. Steed* was sinking at the bow, but not fast enough for Winter's liking. U-103 waited for the survivors, all accounted for, to make it to the life boats before a deck gun crew opened fire on the stern of *W. L. Steed*. The gun crew fired seventeen shells into the vessel before it exploded, finally sinking *W. L. Steed*. U-103 backed off and disappeared to leave the four life boats stranded in the snow (Hickam 1989:34-35; Naval History and Heritage Command 2015). Unfortunately each boat drifted apart in the weather and over the course of the next week, three of the four life boats were located, with the fourth never to be seen again. Of thirty-eight crewmembers, ultimately only five survived.

In identifying potential shipwreck remains, it should be noted that *Washingtonian* is also listed within the BOEM ASD at a second location, Survey Area 6 (see below). These two survey areas are over 2.5 nautical miles apart. Additionally, the location for *W. L. Steed* is presumed to be between 90-100 miles from Ocean City, MD. This is well outside of the research area of the project, as well the location of this survey area is only approximately 19 miles from Ocean City, MD. However, a positive identification of *W. L. Steed* has never been confirmed, so there is some potential for this to be the site for the shipwreck.

Survey operations at Survey Area 1 began on 8 July 2015 with side scan sonar passes over Targets 033 and 034. As originally identified, Targets 033 and 034 were described as being from charted shipwreck events, with 033 having a sonar reading measurement of 1.78 m (5.84 ft) in width and 2.86 m (9.38 ft) in length. The sonar measurement for Target 034 was 18.43 m (60.47 ft) wide and 128.8 m (422.57 ft) in length, with a magnetic anomaly at its strongest signature measuring 12283 nT for 75 m (246 ft) (Watts 2014). On 8 July 2015, a total of twelve side scan sonar passes were completed over Survey Area 1, with varying degrees of success. The site was

reinvestigated on 10 July 2015 in an attempt to gather an acceptable image of the targets, with much better success. The survey area was approached from the NW, moving towards the SE using a sonar range of 50 m (164 ft). Target 034 is depicted in Figure 6.

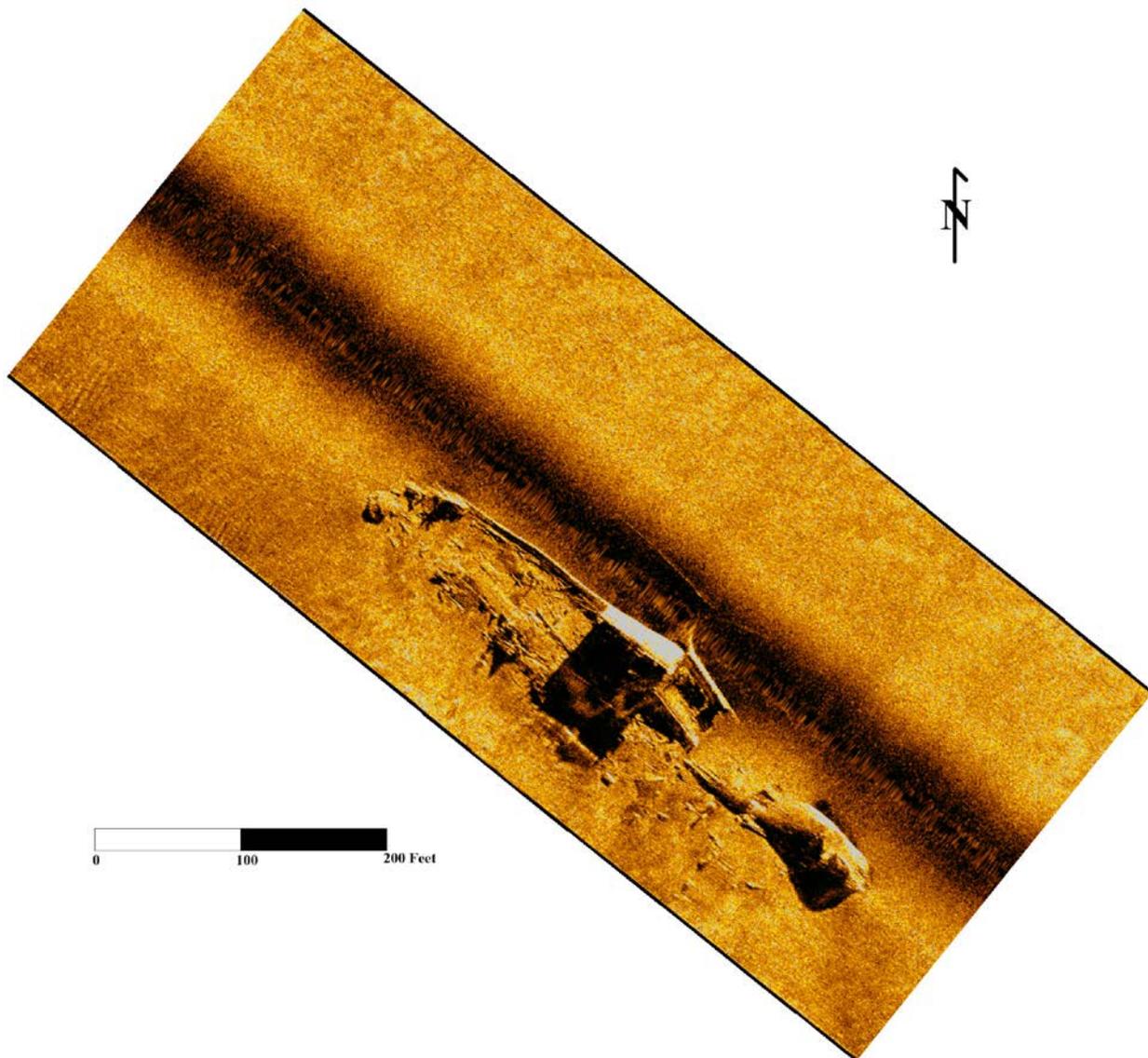


Figure 6. Sonar image of Target 034.

The site was identified as approximately 426.72 ft (130.06 m) in length and approximately 76.85 ft (23.42 m) in width. Evidence indicates characteristics of a submerged cultural resource, specifically a shipwreck. The vessel remains are oriented in a NW to SE direction. Acoustic shadows at various points, specifically what could be possibly the amidships and stern areas, show evidence of high relief. A sector scan sonar survey was completed in addition to the side scan sonar survey in an effort to further examine the relief and disposition of the site (Figure 7). The sector scan sonar was set at a 50-m (164-ft) range and was able to successfully acquire

images of the site. Further analysis was accomplished by using side scan imagery of Target 034 with the Fledermaus program, depicted in Figure 8.

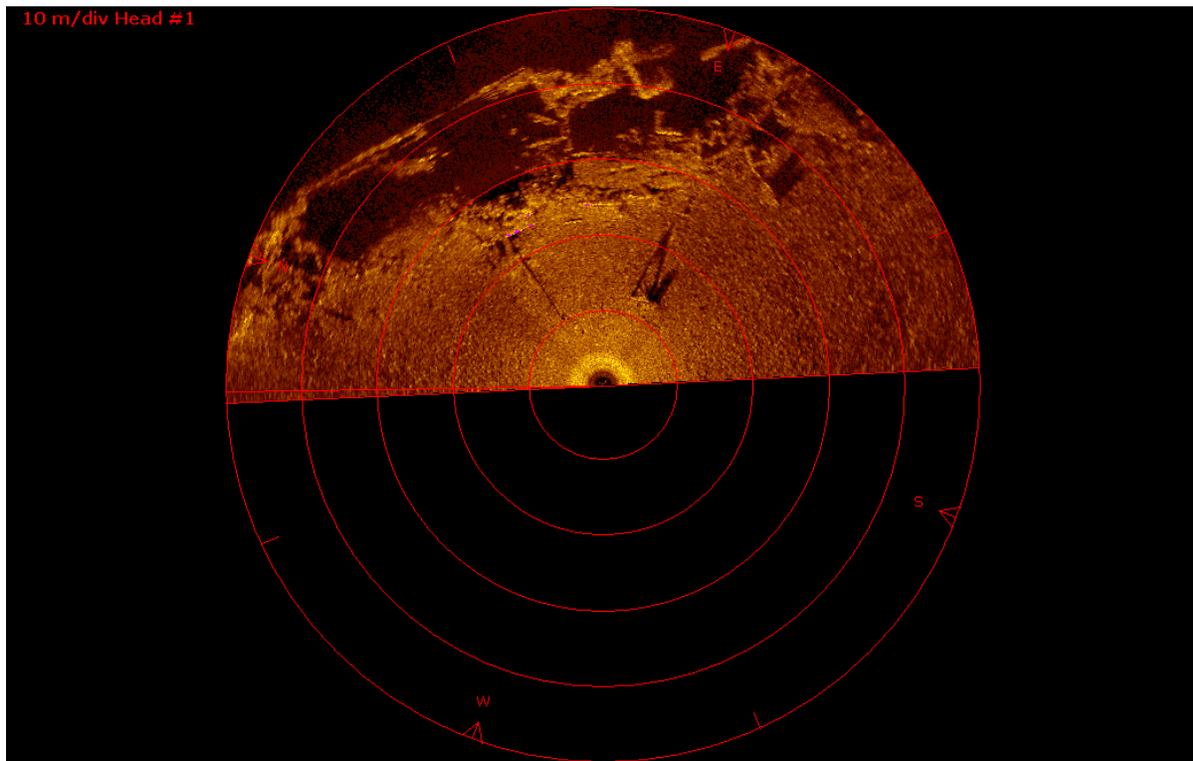


Figure 7. Sector scan sonar image of Target 034, at 50 m (164 ft), 180 degrees.

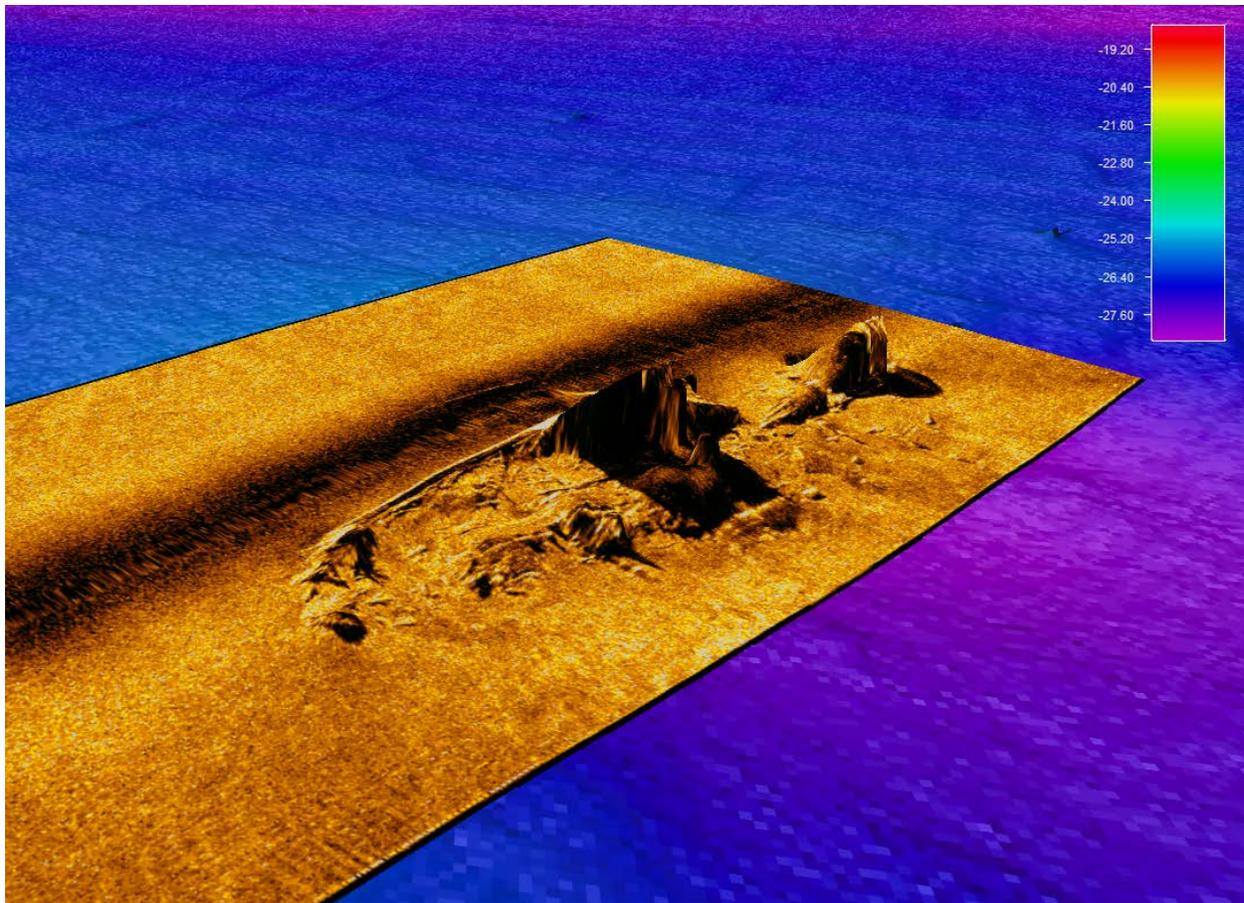


Figure 8. Side scan sonar imagery of Target 034 draped over NOAA bathymetry.

With the positive identification of a submerged cultural resource it was appropriate to further investigate the survey area with dive operations, which first took place on 11 July 2015. At a depth of 27 m (90 ft), the focus of operations was on examining the overall site for further documentation, noting the large size of the site and the amount of relief that was visible. A total of three dive rotations were completed from 11 July to 12 July 2015 documenting site conditions with video and still photography. Diver observations confirmed the existence of ship remains, with areas of high relief (Figures 9 to 12).

Divers noted the condition of the site to be relatively disarticulated in the vicinity of the bow and stern with an area of high relief amidships containing a variety of features including boilers and a condenser. Portions of the boilers are visible in the sector scanning sonar imagery acquired in Figure 7. Extremely low visibility prevented photography and video of these features. There is evidence of steel outer hull extending along possibly the starboard side, amidships toward the bow, with machinery pieces, including a winch, scattered in this area. Identification of shipwreck type, cargo or tanker, was not determined at this time. Further investigation of the site is recommended to determine identity and further investigate features of the site. Based on the size of the site, both *W. L. Steed* and *Washingtonian* are candidates. Given the connection of both these wrecks to significant historical events, both are likely eligible for listing on the NRHP.

Avoidance of this site by a minimum distance of 50.0 m (164 ft) from the visible extent of the hull remains is recommended for any future activities that may be proposed in this area.



Figure 9. Vessel remains at Survey Area 1, Target 034.



Figure 10. Vessel remains at Survey Area 1, Target 034.



Figure 11. Vessel remains at Survey Area 1, Target 034.



Figure 12. Vessel remains at Survey Area 1, Target 034.

Survey Area 2: Target 038

As originally identified, Target 038 is comprised of four SSS targets (038-041) from the regional survey (Watts 2014) and four entries from the ASD, all of which are listed as vessels. Two magnetic anomalies also are co-located with the survey area, the strongest of which measures 4540 nT in strength for a duration of 46 m (150 ft). The survey area measures 0.16 square km in area. The distance from the nearest ASD entry to Target 038 extends 25 m (82 ft).

There is only one named vessel that may be associated with Survey Area 2, a barge called *H Buoy Wreck*. There is currently no known documentation available to the history of *H Buoy Wreck*; the site has been identified and is listed as the remains of a wooden schooner/barge, but this is the only known information available regarding the remains at this location.

Survey operations at Survey Area 2 began on 10 July 2015 with side scan sonar passes over Targets 038 through 041. As originally identified, Target 038 was the largest of the targets, having a sonar reading measurement of 35.8 m (117.45 ft) in width and 135.6 m (444.88 ft) in length. This target also had a magnetic anomaly at its strongest signature measuring 4540 nT for 46 m (151 ft) (Watts 2014). Target 039 had a sonar reading measurement of 2.37 m (7.78 ft) in width and 13.41 m (44 ft) in length, with no associated magnetic anomaly. Targets 040 and 041 were smaller targets, with 041 being the smallest of the four. On 10 July 2015, a total of nine side scan sonar passes were completed over Survey Area 2 with varying degrees of success. The targets were approached from the SW, using a range of 75 m (246 ft) and later, when reacquiring the GPS coordinates, the range was reduced for higher resolution. During the acquisition of data,

it was determined that Target 038 (Figure 16) was most likely associated with a shipwreck, and Targets 039, 040, and 041 (Figures 14 and 15) could be either debris associated with the shipwreck, or these targets could be unrelated to the wrecking incident.

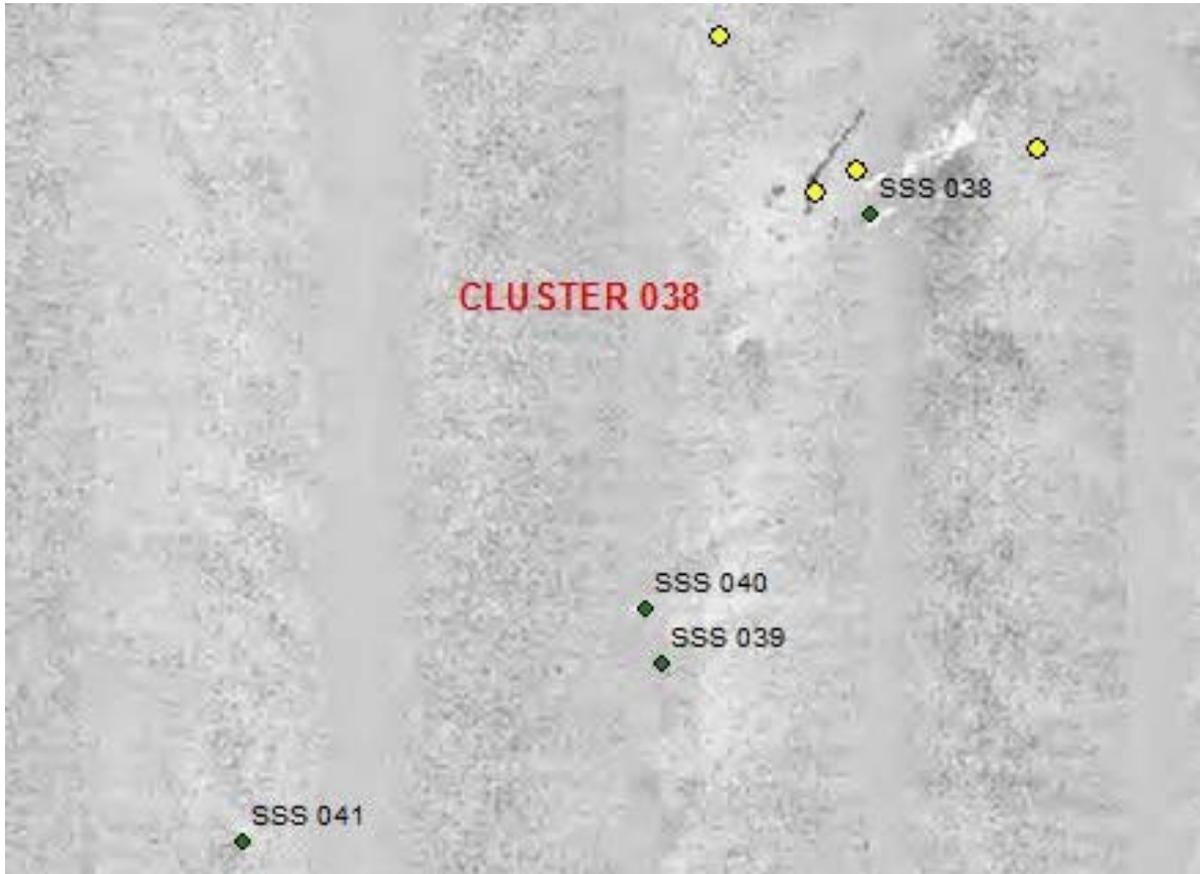


Figure 13. Survey Area 2, comprised of regional survey Targets 038 through 041 and four entries from the ASD. Yellow dots represent ASD entries and green dots represent Targets 038 through 041.

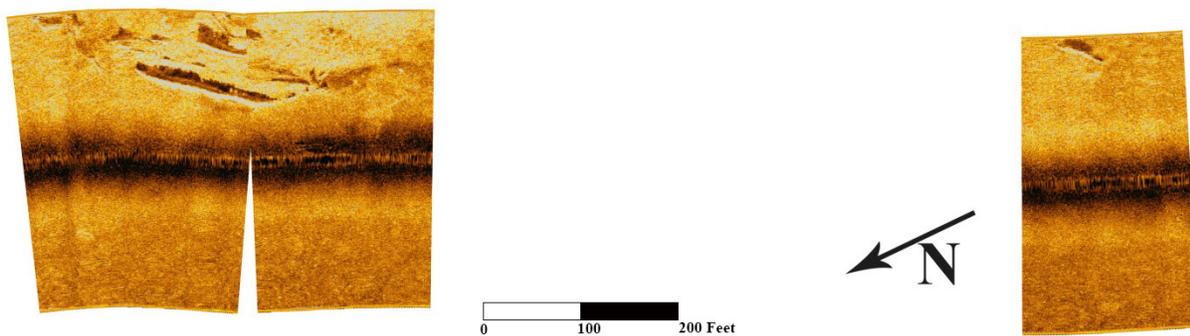


Figure 14. Survey line depicting Targets 038 and 039.

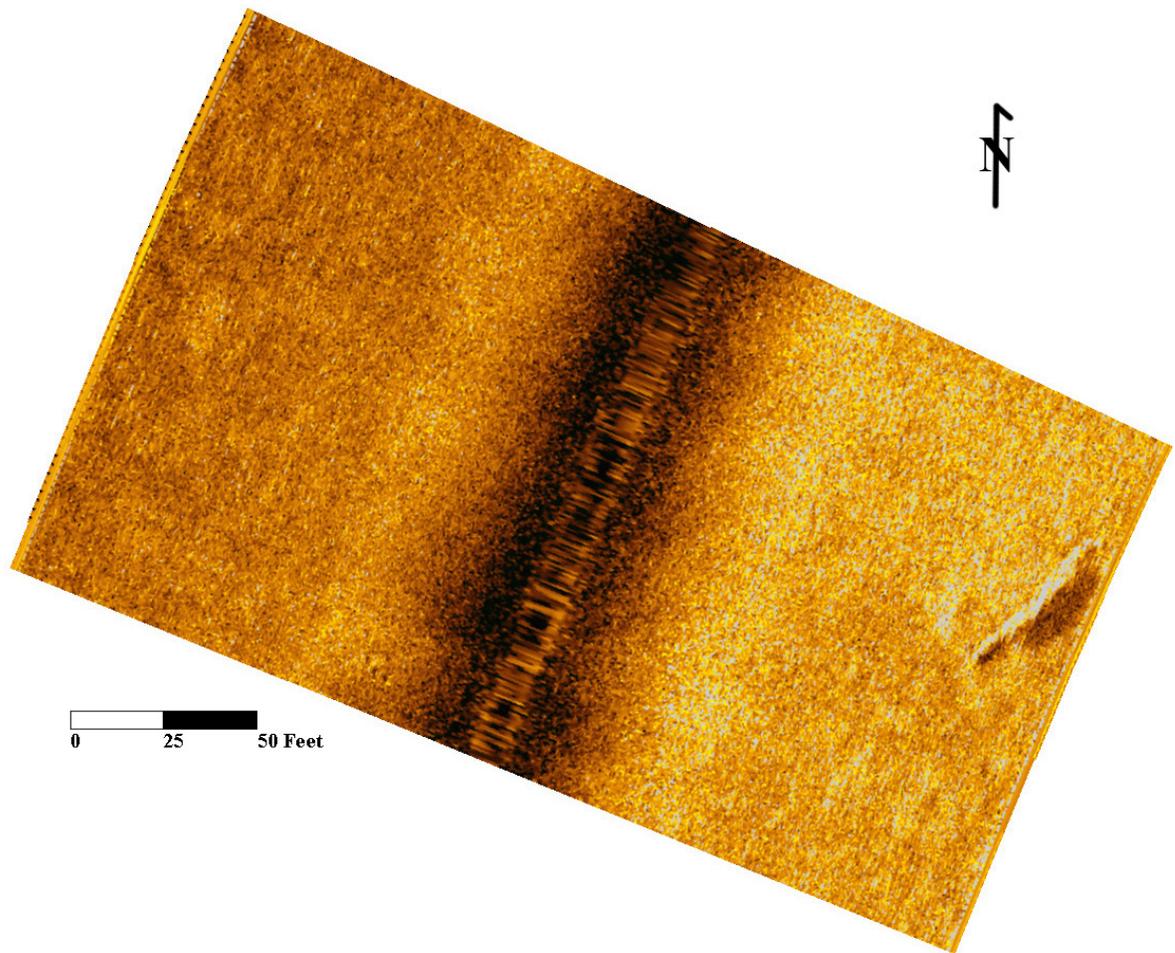


Figure 15. Detailed image of Target 039 or 040.

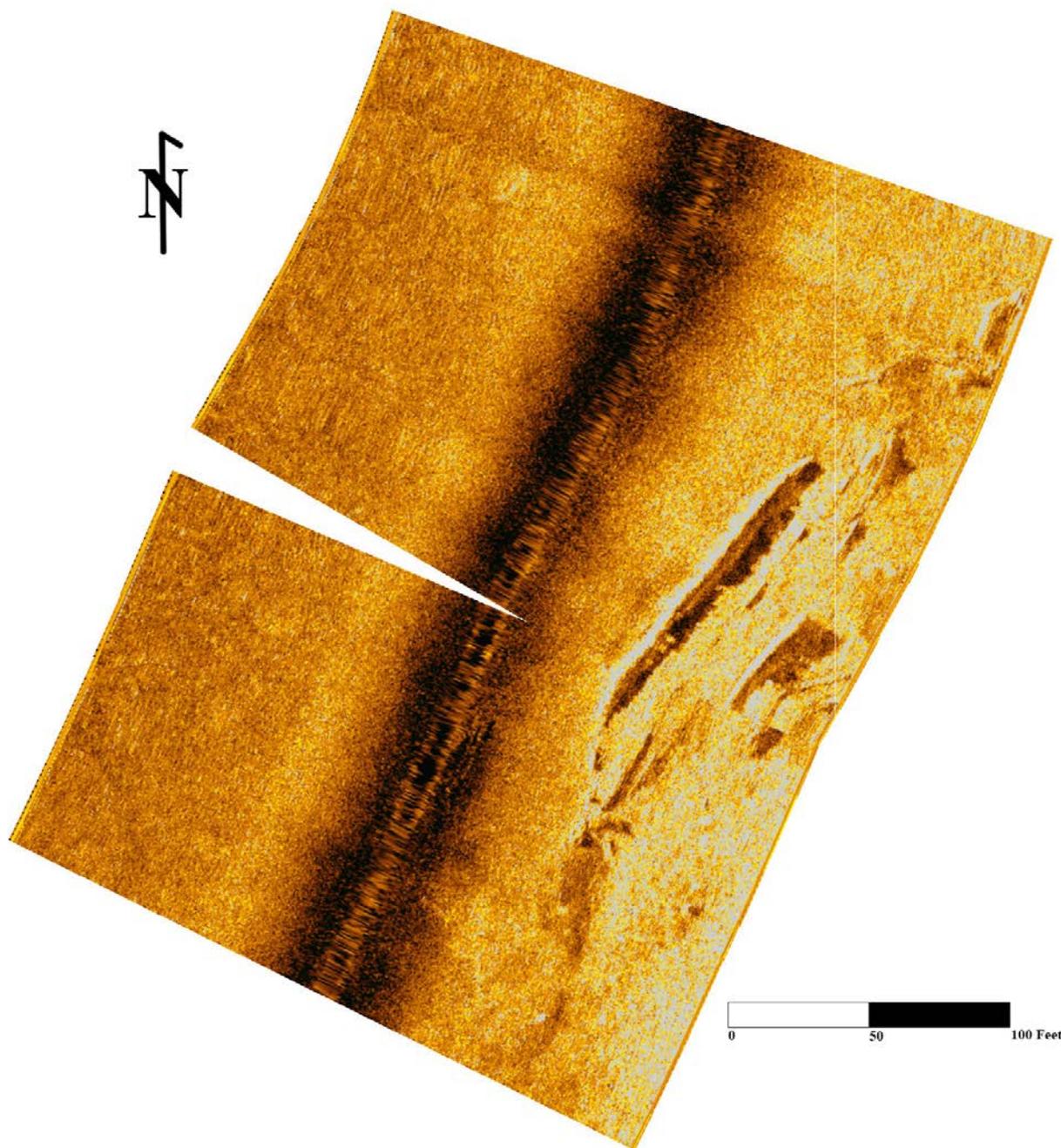


Figure 16. Detailed image of Target 038.

Target 038 measured 187.83 ft (57.25 m) in length and 93.17 ft (28.4 m) in width. Evidence indicated characteristics of a submerged cultural resource, potentially a shipwreck. The vessel remains were oriented in a SW to NE direction. Acoustic shadows showed evidence of slight relief. Either Target 039 or 040 (Figure 15), not specifically determined at this point, is located approximately 847.21 ft (258.23 m) SW of Target 038. This site had a scatter length of approximately 49.69 ft (15.14 m) and a site scatter width of 6.78 ft (2.07 m). Sector scan sonar surveys were completed on 12 July and 13 July 2015 in addition to the side scan sonar survey in

an effort to further examine the relief and disposition of Target 038 (Figure 17). The sector scan sonar set at a 50 m (164 ft) range successfully acquired images of Target 038.

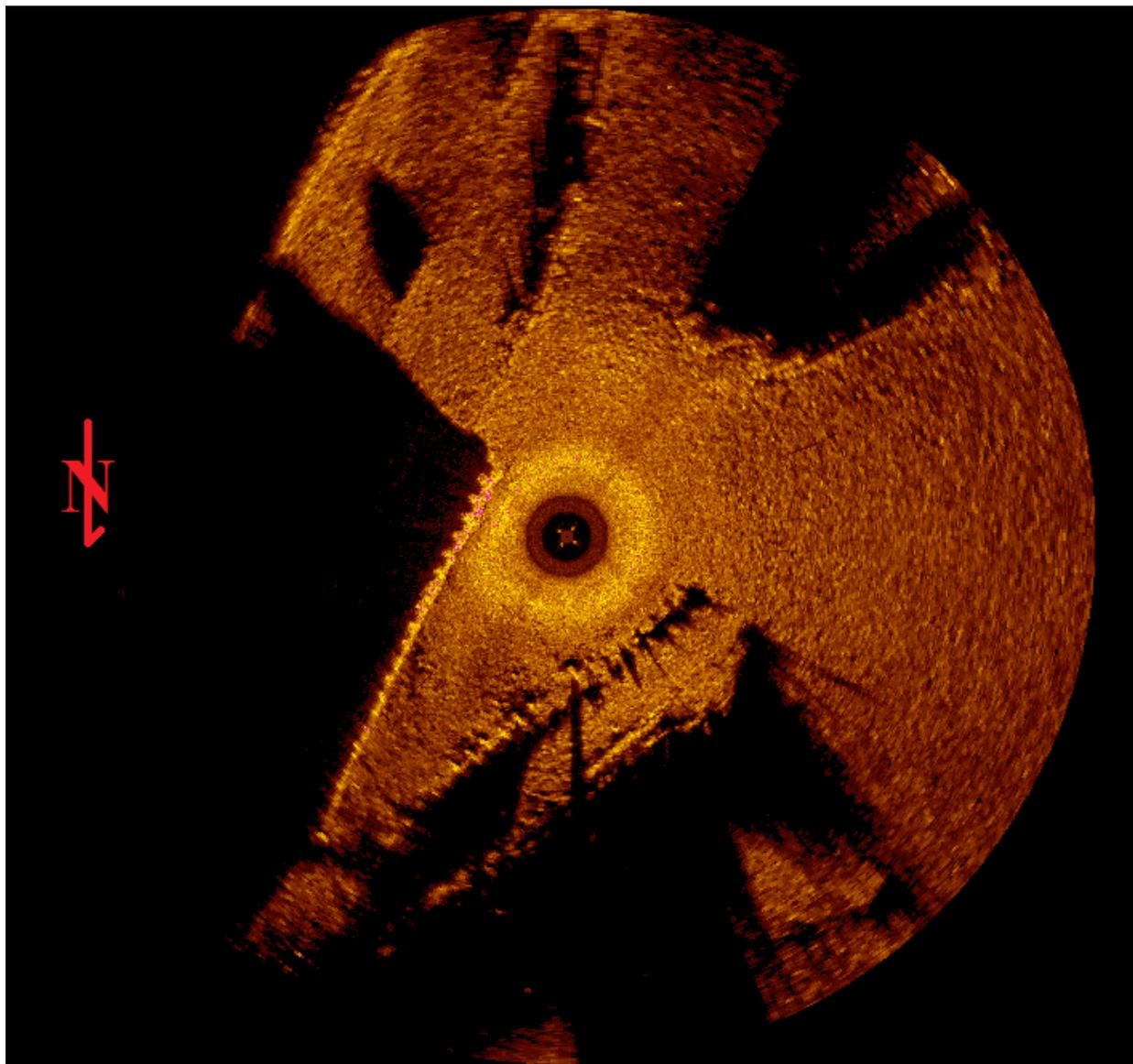


Figure 17. Sector scan sonar image of Target 038 at 50-m (164-ft) range, 360 degrees.

With the positive identification of a submerged cultural resource it was appropriate to further investigate the survey area with dive operations, which first took place on 12 July 2015. At a depth of 25 m (85 ft), the focus of the first dive was on examining the overall site for further documentation, noting the large size of the site and the amount of relief that was visible. A total of two dive rotations were completed from 12 July to 13 July 2015 documenting site conditions with video and still photography. Diver observations from the first dive confirmed the existence of ship remains, describing the site as a small wooden-hulled wreck with low relief, with remains “flayed open” (Figures 18 to 22). From the second dive on 13 July 2015, observations indicated

that there are possibly two separate wooden-hulled wrecks at the site, as framing patterns seem to be oriented in different directions and look dissimilar to one other.

Both structures were roughly oriented along a southwest to northeast axis and contain articulated hull structure, as illustrated in Figure 17. The structure to the north exhibited a slightly higher level of preservation and contained visible framing, intact remains of outer hull planking, and remains of interior ceiling planking standing approximately 0.6 m (2 ft) above the sea floor, as illustrated in Figures 18 and 19. These remains are visible from bow to stern along both port and starboard sides of the potential hull. The structure to the south appeared less intact and contained visible evidence of frames, as illustrated in Figures 20 and 21. The extent of wooden structure present below the seafloor was not determined. Additional debris located to the west and between the two structures (See Figure 17) was not investigated by divers. Targets 039, 040, and 041 also were not examined by divers, due to time constraints, and could potentially be associated with the site. Further investigation is recommended to more fully investigate all features within the target; to delineate the complete extent of the archaeological site; and to determine if Targets 039, 040 and 041 are associated with the shipwreck remains. Avoidance of Target 038 by a minimum distance of 100.0 m (328 ft) is justified for any future activities that may be proposed in this area until additional investigations are conducted.



Figure 18. Wooden structure at Target 038.



Figure 19. Wooden structure at Target 038.



Figure 20. Framing pattern at Target 038.



Figure 21. Framing pattern at Target 038.



Figure 22. Possibly a wooden cargo hatch at Target 038.

Survey Area 3: Target 071

As originally identified, Target 071 is comprised of four targets (071-074) from the regional survey (Watts 2014) and one entry from the ASD, record 8000 (Vessel Unknown). Two magnetic anomalies also are co-located with the target, the strongest of which measures 4630 nT in strength for a duration of 36.3 m (119 ft). The survey area measures 0.007 square km in area. The distance from the nearest ASD entry to Target 071 extends 55 m (180 ft).

The unknown vessel represented in the ASD target is described as a fishing obstruction with limited data. With this information, survey operations at Survey Area 3 began on 8 July 2015 with side scan sonar passes over Targets 071 through 074. As originally identified, Target 071 was the largest of the targets, having a sonar reading measurement of 44.38 m (145.60 ft) in width and 91.85 m (301.38 ft) in length. This target had a magnetic anomaly at its strongest signature measuring 4630 nT for 36.3 m (119.09 ft) (Watts 2014). On 8 July 2015, a total of eleven side scan sonar passes were completed over Survey Area 3 with varying degrees of success. The targets were approached from both E to W and NE to SW, using a range of 75 m (246 ft). During the acquisition of data, it was determined that Target 071 (Figure 25) was most likely associated with a shipwreck, and Targets 072, 073, and 074 (Figure 24) could be debris associated with the shipwreck, or something unassociated with the wrecking incident.

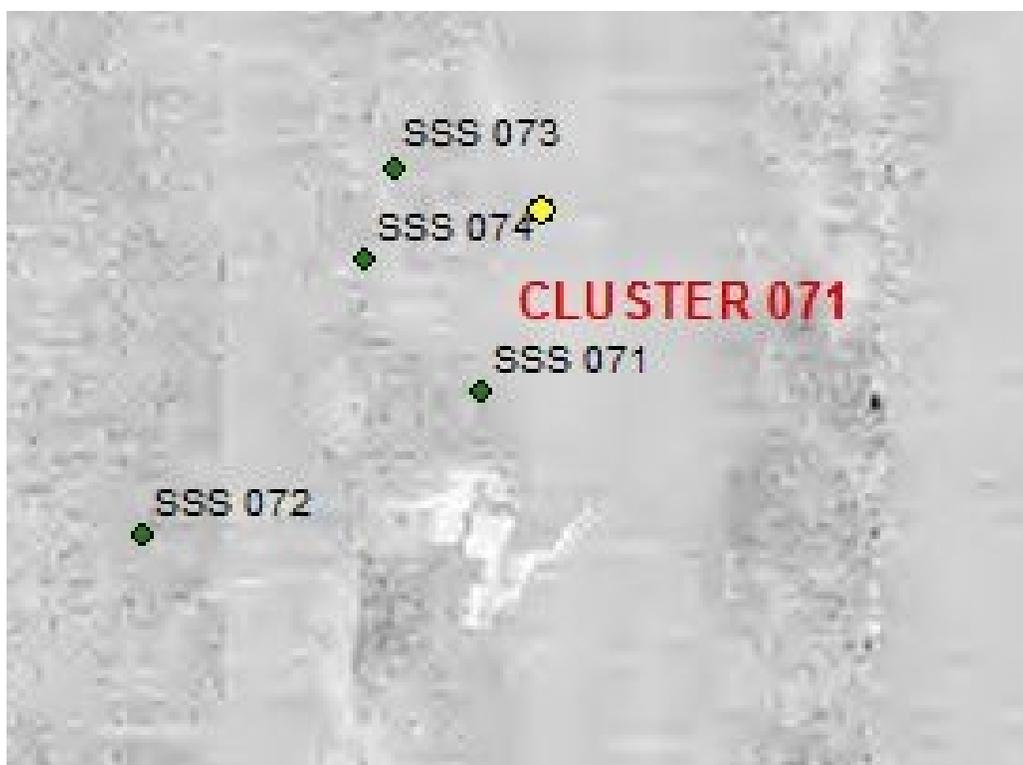


Figure 23. Survey Area 3, comprised of regional survey Targets 071 through 074 and one entry from the ASD. Yellow dots represent ASD entries and green dots represent Targets 071 through 074.

Target 071 measured 243.56 ft (74.24 m) in length and 149.50 ft (45.57 m) in width. Evidence indicated characteristics of a submerged cultural resource, potentially a shipwreck. The vessel remains were oriented in a SW to NE direction. Acoustic shadows showed evidence of slight relief. Either Target 073 or 074, not specifically determined at this point, is located approximately 357.20 ft (108.87 m) E of Target 071. This site has a scatter length of approximately 39.08 ft (11.91 m) and a site scatter width of 5.98 ft (1.82 m). Sector scan sonar surveys were completed on 10 July 2015 in addition to the side scan sonar survey in an effort to further examine the relief and disposition of the site (Figure 26). The sector scanning sonar set at a 75-m (246-ft) range successfully acquired images of Target 071.

With the positive identification of a potential submerged cultural resource it was appropriate to further investigate the target with dive operations, which first took place on 11 July 2015. During this first dive, operations focused on examining the overall site for further documentation, noting the large size of the site and the amount of relief that was visible. A total of two dive rotations were completed on 11 July 2015 documenting site conditions with video and still photography.

At a depth of 22 m (73 ft), diver observations from the first dive confirmed the existence of ship structure, describing the site as the remains of the lower portion of the hull of a composite built ship with metal frames and wood hull planking (Figures 28 to 31). On the second dive on 11 July 2015, observations indicated a possible donkey boiler, a steam boiler used to operate deck machinery. Measurements of visible framing also were taken. Evidence of paired frames

measured approximately 60 cm (23.6 in) in total width, each frame approximately measuring 30 cm (11.8 in). Bolt holes that were identified measured approximately 3 cm (1 in) in diameter.

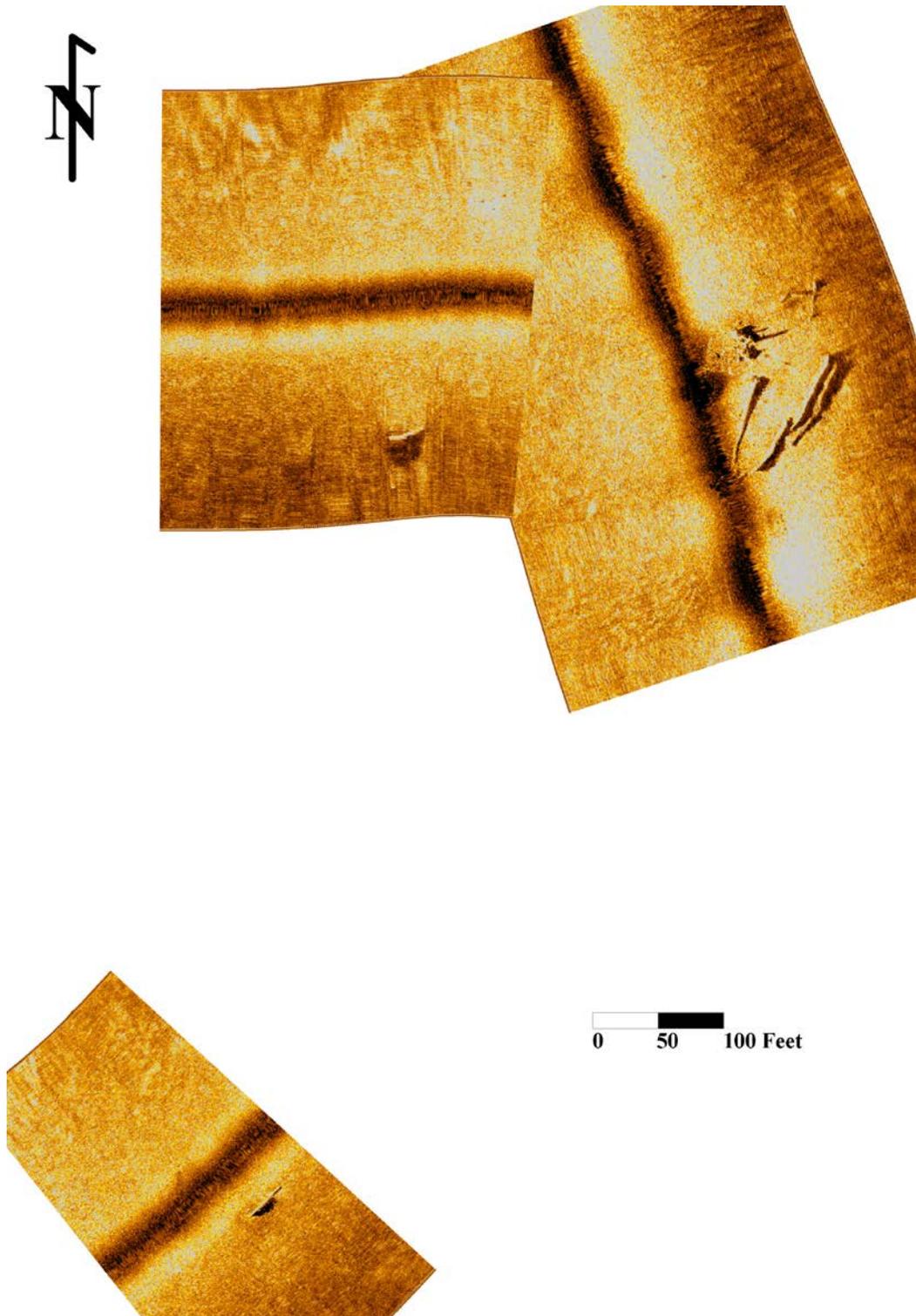


Figure 24. Survey line depicting Survey Area 3, Targets 071 through 074.

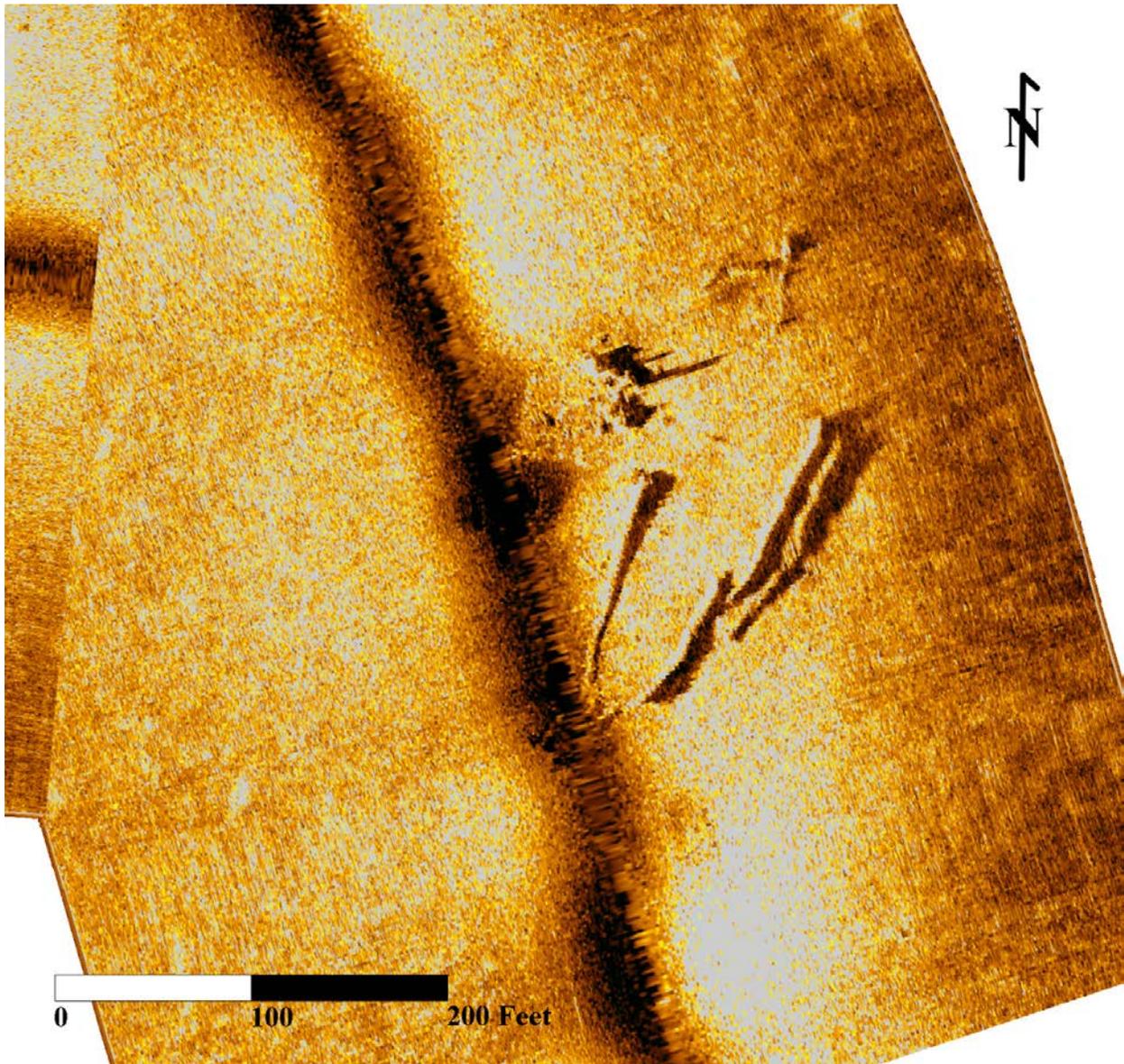


Figure 25. Survey line depicting Target 071.

There was potential evidence of outer hull and framing extending along possibly the port side, amidships toward the bow with other features visible in the area. Further investigation of visible remains could help determine the identity of the wreck site, although the majority of the remains at Target 071 were examined. Targets 072, 073, and 074 were not examined by divers due to time constraints, although these targets could potentially be culturally significant and warrant future inspection to determine their association with the wreck site. Avoidance of Target 071 by a distance of 50.0 m (164 ft) is justified until additional investigations may be conducted to assess the resource's eligibility for listing on the National Register.

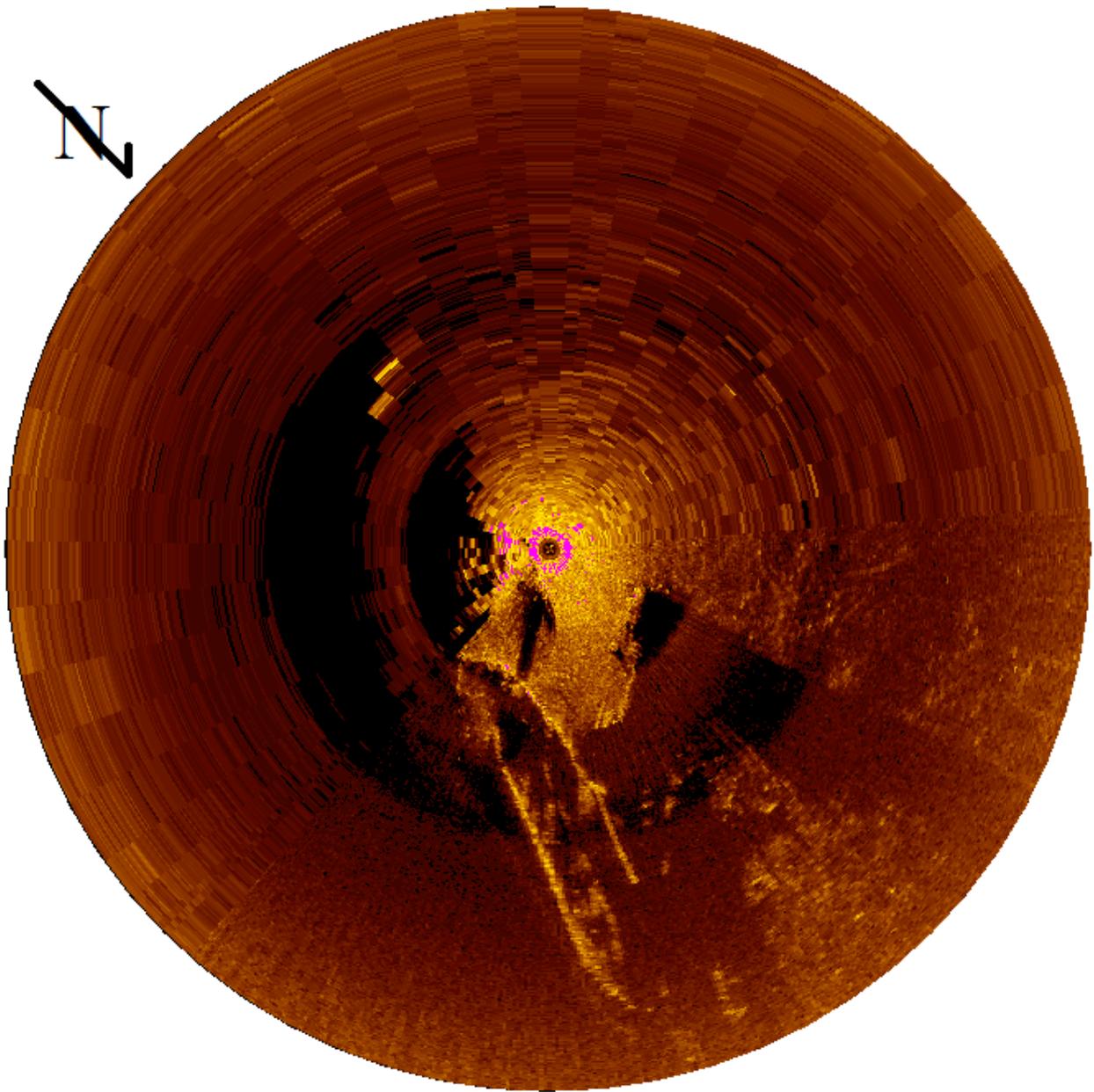


Figure 26. Sector scan sonar image of Target 071 at 75 m (246 ft), 360 degrees.

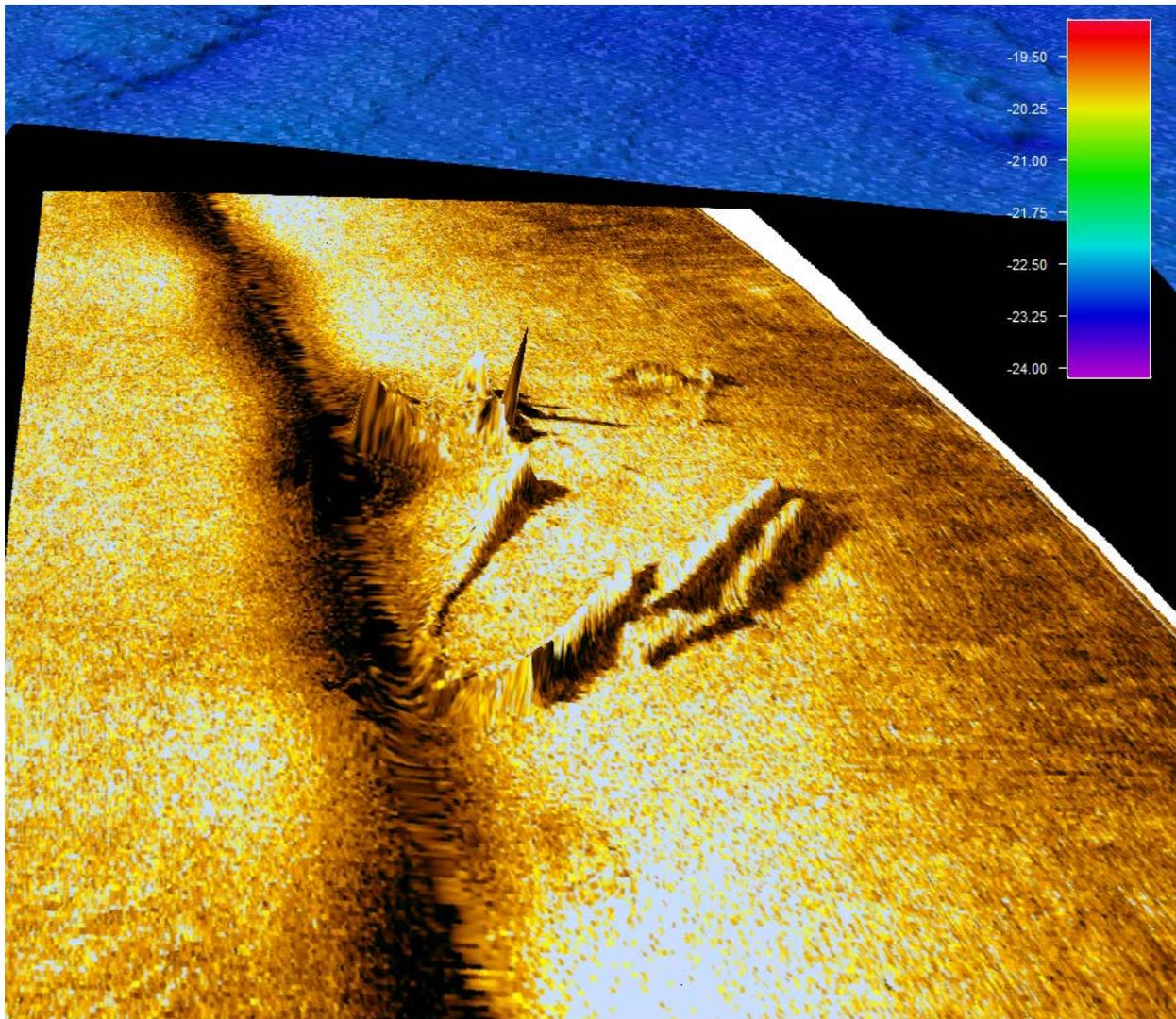


Figure 27. Side scan sonar imagery of Target 071 draped over NOAA bathymetry.



Figure 28. Diver inspecting hull structure at Target 071.



Figure 29. Evidence of wooden structure at Target 071.



Figure 30. Machinery remnants at Target 071.

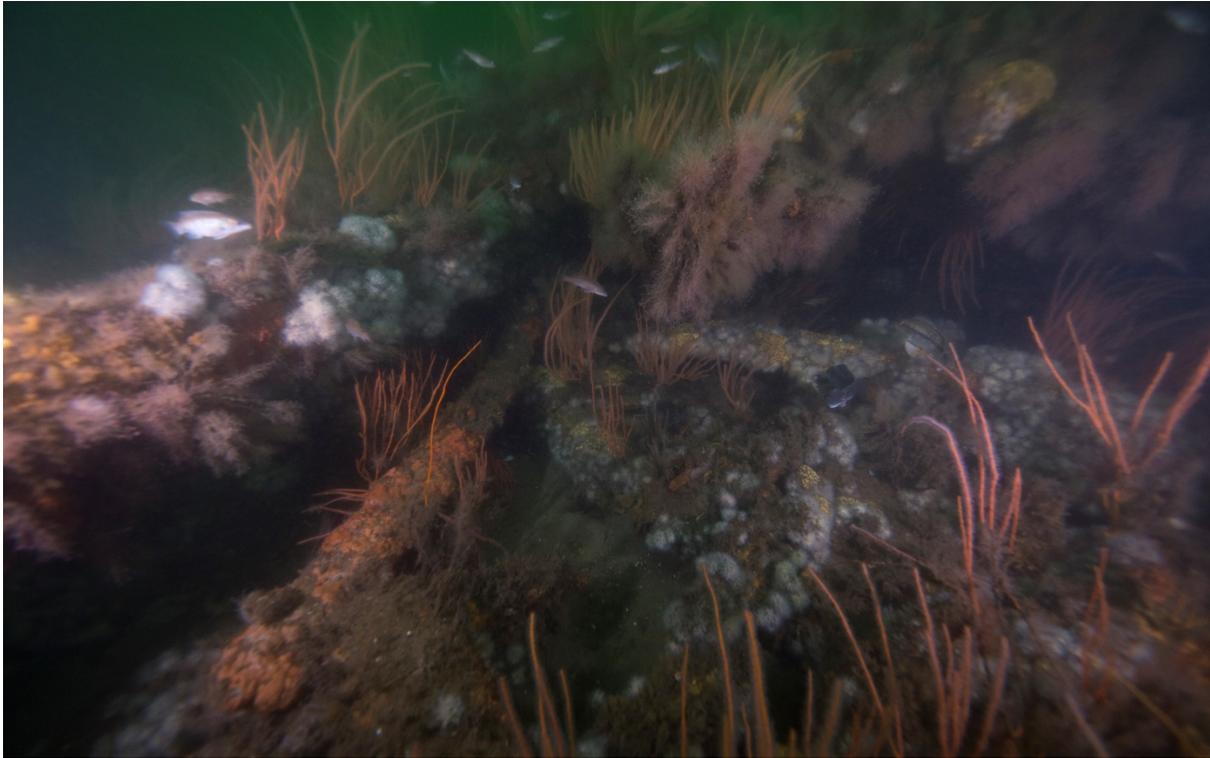


Figure 31. Wreckage remains at Target 071.

Survey Area 4: Target 029

As originally identified, Target 029 is comprised of three SSS targets (029, 030, and 031) from the regional survey (Watts 2014) and one entry from the ASD, record number 9753 (the vessel *Rocks*). Several magnetic anomalies also are co-located with the target, the strongest of which measures 2559 nT in strength for a duration of 29.92 m (98.16 ft). The survey area measures 0.01 square km in area. The distance from ASD entry to Target 029 extends 50 m (164 ft).



Figure 32. Survey Area 4, comprised of regional survey Targets 029 through 031 and one entry from the ASD. Yellow dots represent ASD entries and green dots represent Targets 029 through 031.

The vessel *Rocks* listed in the ASD has limited data associated with the wreck site, with only reference to vessel name and location. Further research has uncovered little regarding the history of the reported vessel. Using limited background information, survey operations at Survey Area 4 began on 10 July 2015 with side scan sonar passes over Targets 029 through 031. As originally identified, Target 031 was the largest of the targets, having a sonar reading measurement of 29.38 m (96.39 ft) in width and 77.90 m (255.58 ft) in length. This target did not have a magnetic anomaly associated with it; however, Target 029 had one, with its strongest signature measuring 2559 nT for 29.92 m (9816 ft). Target 029 also originally measured 25.76 m (84.51 ft) in width and 55.41 m (181.79 ft) in length (Watts 2014). On 10 July 2015, a total of seven side scan sonar passes were completed over Survey Area 4 with varying degrees of success. The targets were approached from both an E to W and NE to SW direction, using a range of 50 m (164 ft). During the acquisition of data, it was initially determined that Survey Area 4 (Figure 33) was most likely associated with either shipwreck debris or a scour trail.

Target 029 (Figure 34) measured 4.47 m (14.66 ft) wide and 35.86 m (117.65 ft) in length. Evidence did not give clear indication of a cultural resource and further investigation of the site was warranted. Target 029 was oriented in a SW to NE direction.

Target 031 (Figure 35) measured 16.26 m (53.35 ft) wide and 57.62 m (189.03 ft) in length. Evidence did not give clear indication of a cultural resource and further investigation of the site was warranted. Target 031 was oriented in a SE to NW direction.



Figure 33. Survey line depicting Survey Area 4, Targets 029 through 031.

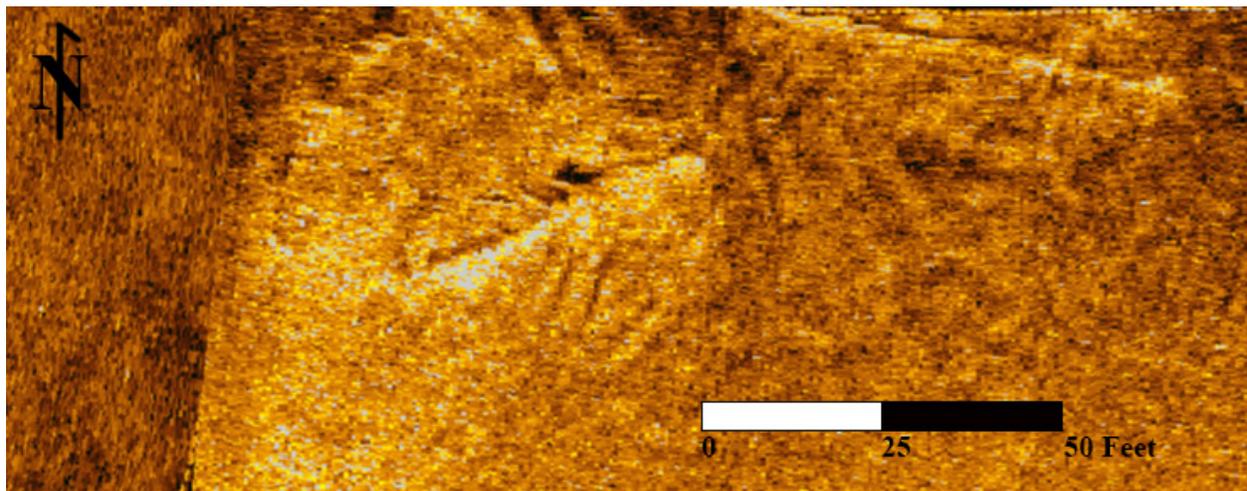


Figure 34. Survey line depicting Target 029.

Target 031 was located approximately 93.81 m (307.79 ft) SE of Target 029. Both targets showed little evidence of high relief. To further investigate Survey Area 4, Target 029 was selected for a sector scan survey. Four drops of the sector scanning sonar on 13 July 2015 provided imagery of potential shipwreck debris. The sector scan sonar set at a 75-m (246-ft) range successfully acquired images of Target 029 (Figure 36).

With the positive identification of a potential submerged cultural resource it was appropriate to further investigate the targets with dive operations, which first took place on 14 July 2015. During this first dive, the focus was on examining the overall site for further documentation, noting the extent of the site and the amount of relief that was visible. A second dive rotation on 17 July 2015 took place to investigate Target 031 documenting site conditions with video and still photography.

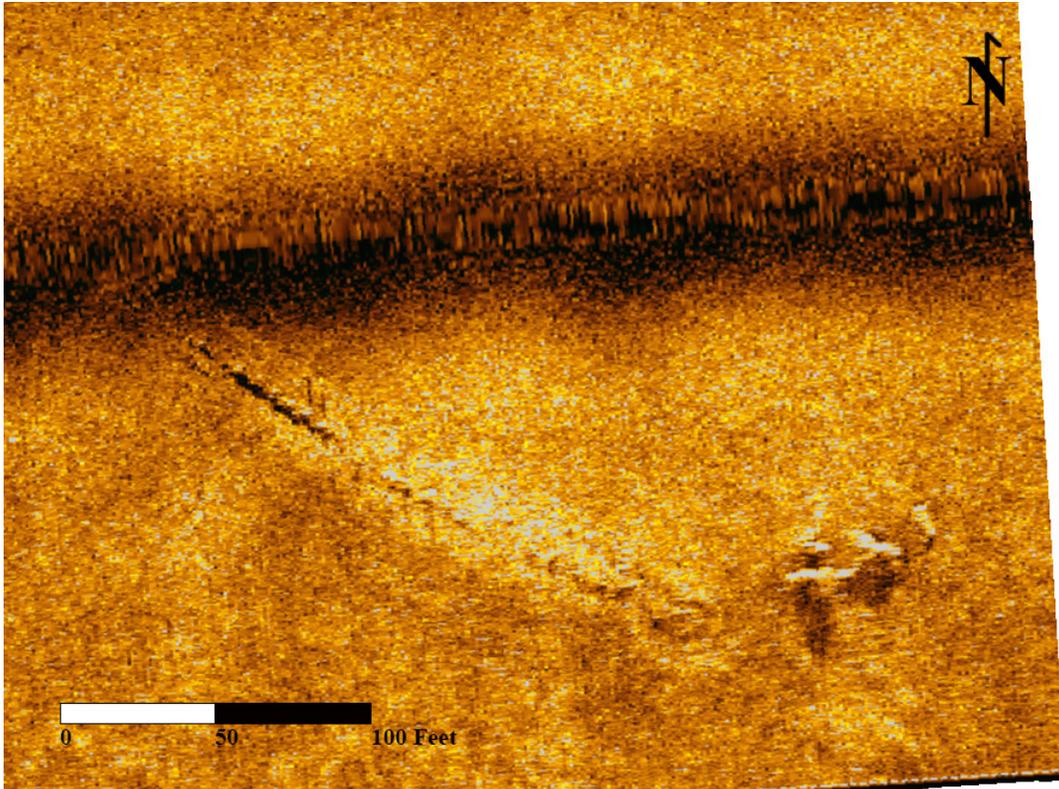


Figure 35. Survey line depicting Target 031.

At a depth of 22 m (75 ft), diver observations at Target 029 confirmed the existence of ship remains, describing the site a wooden built, with slight relief (Figures 37 to 41). Large framing pieces were observed, approximately .91 to 1.2 m (3 to 4 ft) apart in spacing along the hull section (Figures 37 to 39). While the majority of the observed remains appeared consistent with a heavily degraded wooden hull, the presence of large iron or steel frames in one area suggested the possibility of a composite built ship, or extensive repairs (Figures 37 and 38).

Divers noted the condition of the site at Target 029 to be partially intact with visible features remaining, specifically the hull structure. Evidence of outer hull and framing extending along one side was observed.

On the second dive on 17 July 2015, observations of Target 031 indicated the presence of a linear wood timber extending approximately 20-30 m (65-98 ft) across the seafloor with approximately 0.3 m (1 ft) of relief. This feature is visible on the side scan sonar image illustrated in Figure 34 and in Figure 36. The timber was entangled with modern marine debris. The presence of additional wooden structure beneath this visible feature was not determined.

Target 030 was not investigated by divers. Further investigation of Targets 029, 030 and 031 is recommended to gather information to determine if they are associated with a single shipwreck site or indicate the presence of multiple sites. Avoidance is recommended for each individual Target (029, 030, and 031) by a distance of 50.0 m (164 ft) until additional investigations may be conducted to assess eligibility for listing on the National Register.

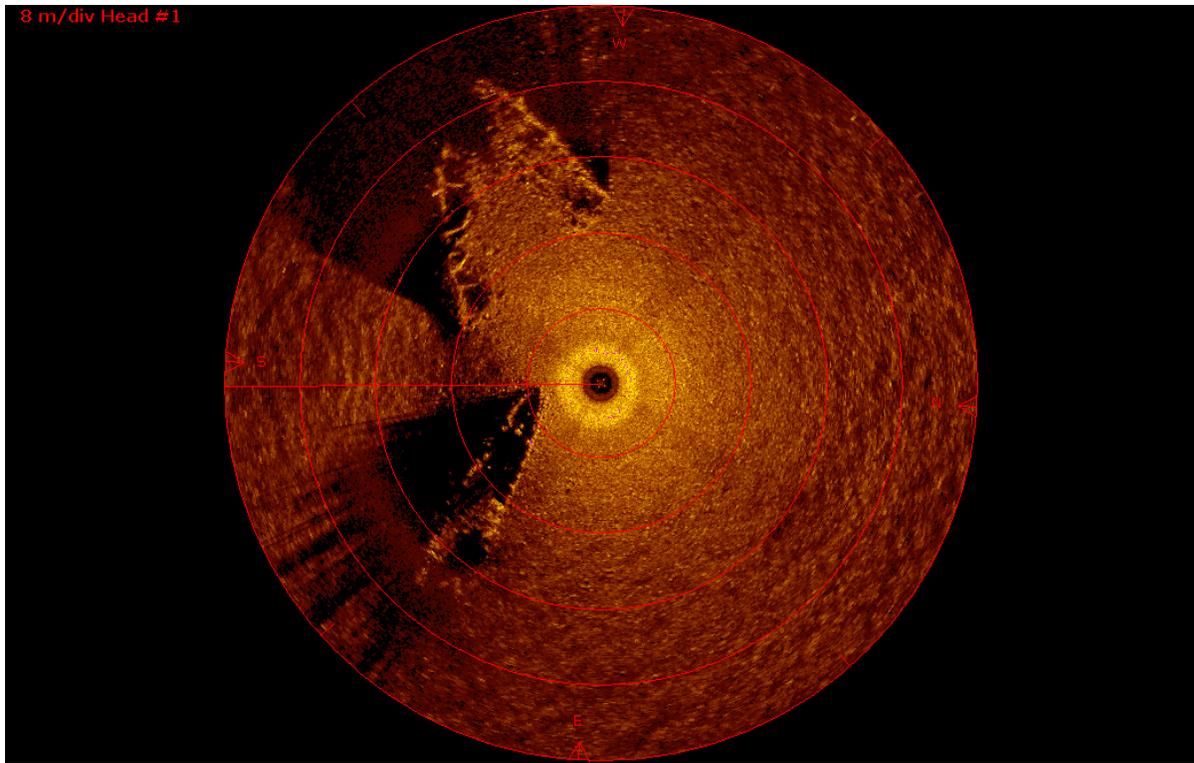


Figure 36. Sector scan sonar image of Target 029 at 75 m (246 ft), 360 degrees.



Figure 37. Linear wooden hull structure observed at Target 031 (J. McCord – CSI).



Figure 38. Diver examining the framing structure located at Target 029.



Figure 39. Framing structure located at Target 029.



Figure 40. Hull structure located at Target 029.

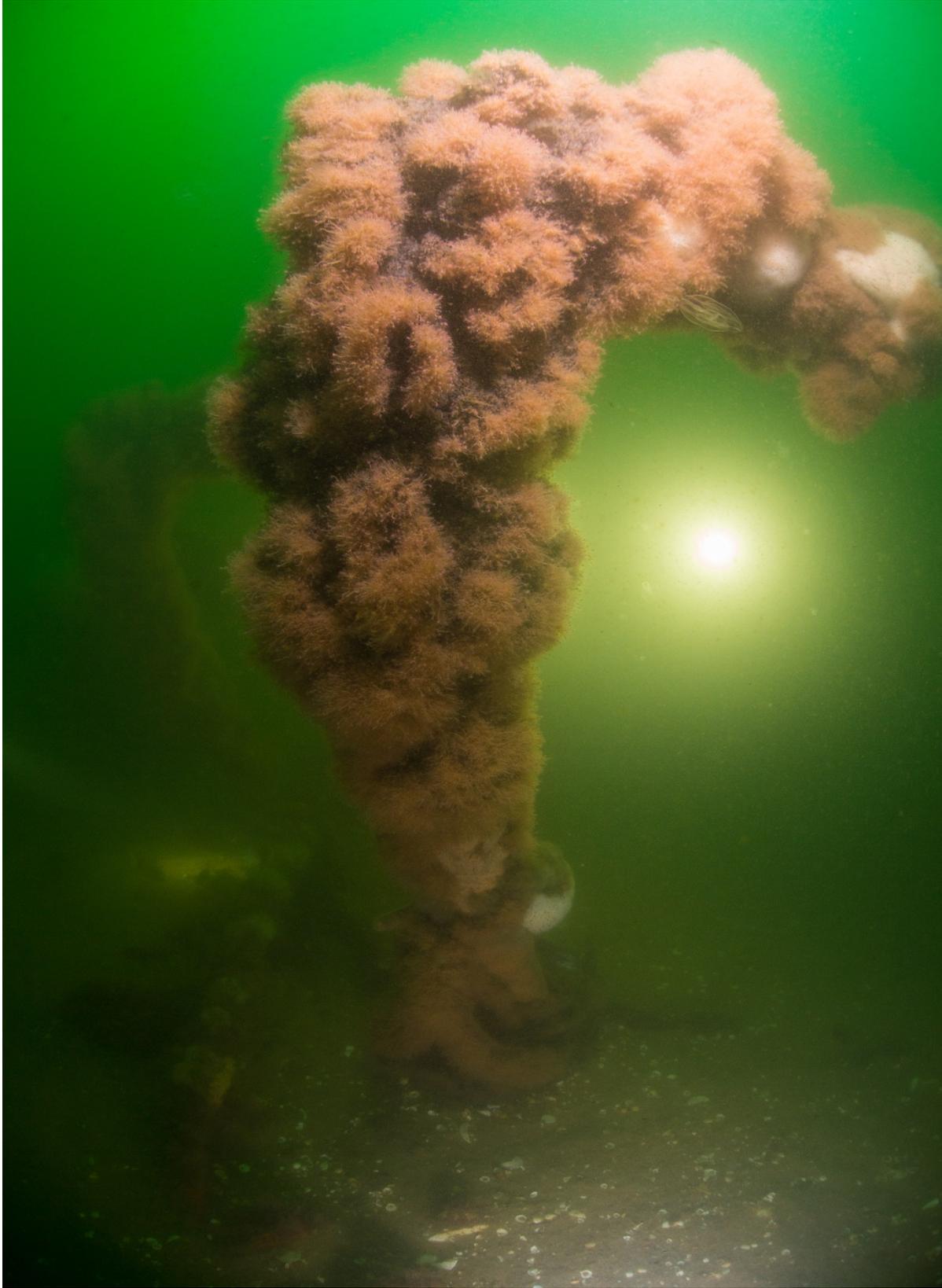


Figure 41. Large framing structure located at Target 029.



Figure 42. A large lobster was one of the many species inhabiting Target 029 (J. McCord – CSI).

Survey Area 5: Target 044

As originally identified, Target 044 is comprised of five SSS targets (044 through 048) from the regional survey (Watts 2014) and no entries from the ASD. No magnetic anomalies are co-located with the cluster. The original surveyors identified this cluster as an uncharted wreck site with associated surface scatter and ballast. Local fishermen rank this area as among the most important within the WEA. The cluster measures 0.02 square km in area.

There are no charted shipwreck sites within Survey Area 5, however, there were two large objects identified within the regional study, Targets 046 and 047. Using limited background information, survey operations at Target Area 5 began on 13 July 2015 with side scan sonar passes over Targets 044 through 048. As originally identified, Target 046 (Figure 43) was one of the larger sites, measuring 30.60 m (100.39 ft) in width and 27 m (88.58 ft) in length. There were no associated magnetometer measurements within Target Area 5. On 13 July 2015, a total of 4 side scan sonar passes were completed over Target Area 5 with varying degrees of success. The targets were approached from both E to W and NE to SW, using a range of both 50 m (164 ft) and 25 m (82 ft) due to conditions in the water, as thermocline issues disrupted quality acquisition of data. Following side scan survey operations, initial analysis of Target Area 5 (Figure 43) could not determine whether features were cultural or geological in nature.

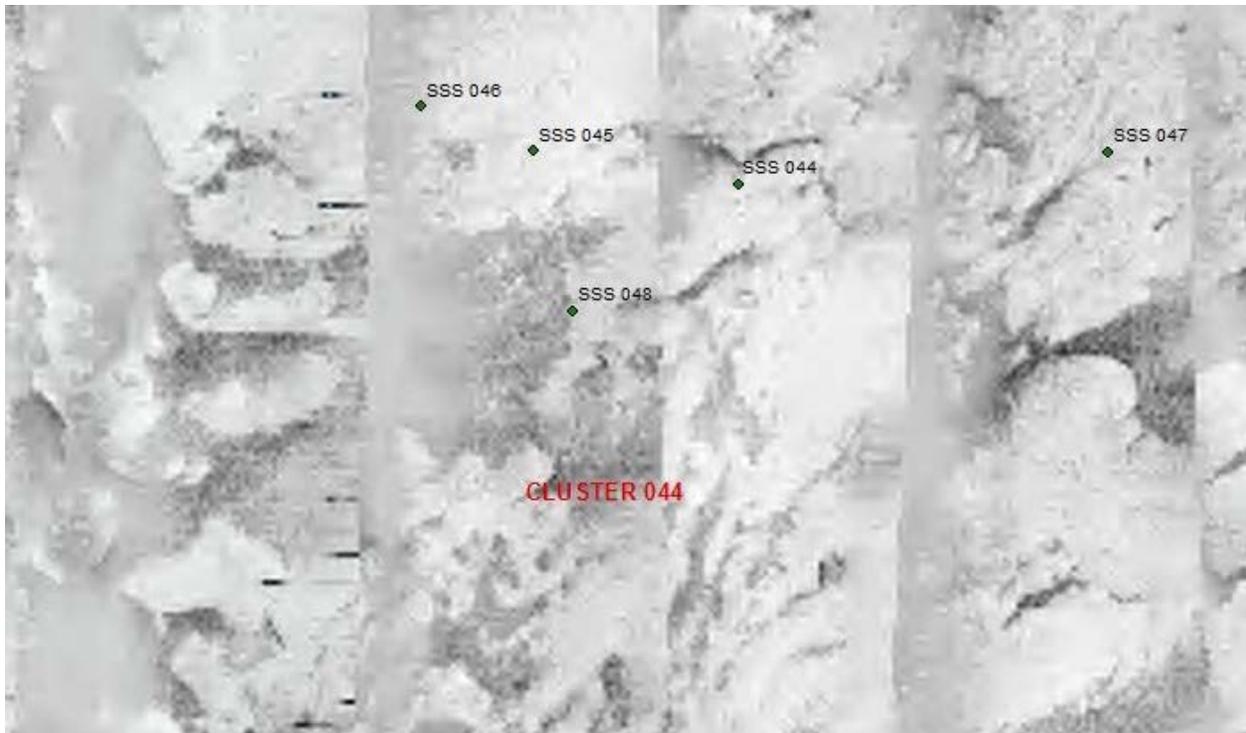


Figure 43. Survey Area 5, comprised of regional survey Targets 044 through 048 and no entries from the ASD. Green dots represent survey Targets 044 through 048.

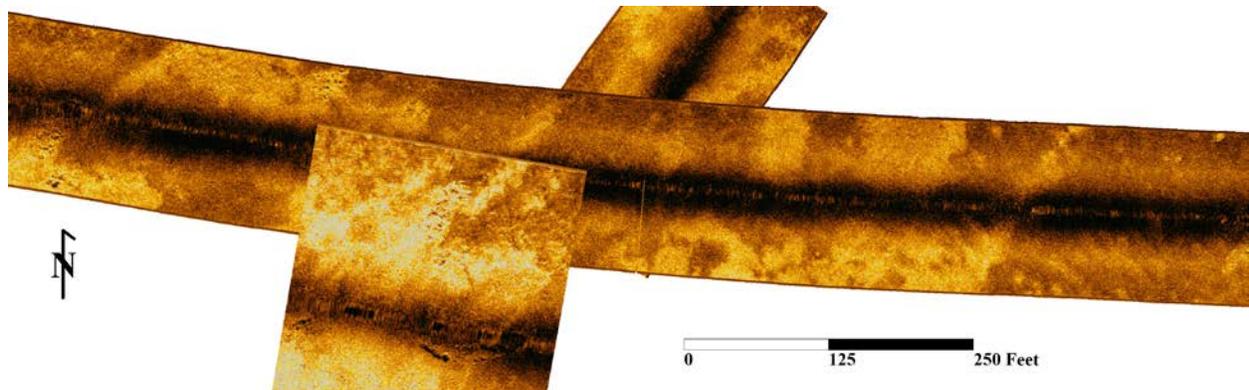


Figure 44. Survey lines of Survey Area 5, including Targets 044 through 048.

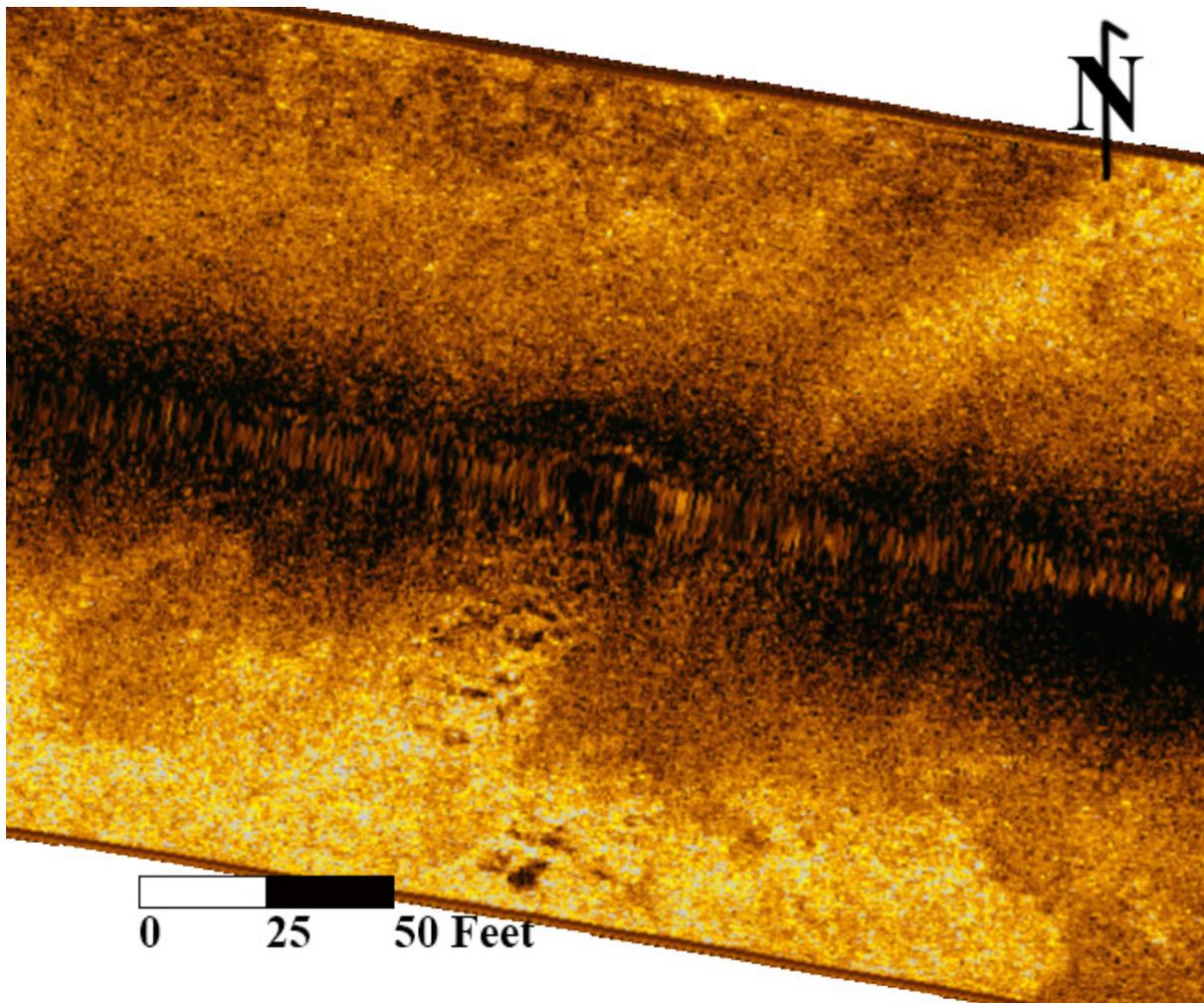


Figure 45. Survey lines depicting Target 046.

Target 046 (Figure 45) measured 20.62 m (67.66 ft) in length and 13.87 m (45.52 ft) wide. Evidence did not give clear indication of the presence of cultural resources and further investigation of the site was required. Target 046 was chosen for diver examination. A total of two dives were attempted on Target 046. The first dive was attempted on 14 July 2015; however, the anchor line was too short in relation to the current, and the dive team was unable to safely reach the site.

A second dive was attempted 17 July 2015 following inclement weather that suspended dive operations for a few days. Due to limited time available, it was imperative to accomplish an overall site assessment that included video and still photography. At a depth of 26 m (85 ft), diver observations from the second dive confirmed the existence of mixed hard bottom of low relief interspersed with patches of sand (Figures 46 to 48).

Divers noted that the target is geological in nature and does not represent an archaeological resource. Based on the similarity of side scan sonar imagery between these targets, Targets 044, 045, 047, and 048 are determined to all likely represent geological features. No further investigations of Target Area 5 are recommended.



Figure 46. Divers examining Target 046.



Figure 47. Geological formation at Target 046.



Figure 48. Geological formation at Target 046.

Survey Area 6: Target 069

As originally identified, Survey Area 6 is comprised of three SSS targets (068 through 070) from the regional survey (Watts 2014) and three entries from the ASD, all of which are listed as vessels. No magnetic anomalies also are co-located with the targets. The survey area measured 0.07 square km in area. The distance from the nearest ASD entry to Target 068 extends 437 m (1433 ft).

There are two named vessels associated with this cluster area, *Washingtonian* and *Avalon*. A description of *Washingtonian* is located in the results section of Survey Area 1: Cluster 034, above. Interestingly, the remains of *Washingtonian* are listed in the ASD in at least two locations, highlighting the fact that the wreck site has never been positively identified. The second vessel associated with this survey area, *Avalon*, is described as being a former tugboat, located at a depth of 17 m (55 ft) (ASD 2557). There is no other description of the tug boat available at this time.

Using limited background information, with no associated magnetometer anomalies, survey operations at Target Area 6 began on 8 July 2015 with side scan sonar passes over Targets 068 through 070. A total of 4 side scan sonar passes were completed over Target Area 5. This included sonar coverage of the reported ASD targets (Figure 50) and one pass over a NOAA charted shipwreck symbol one mile to the E-SE.



Figure 49. Survey Area 6, comprised of regional survey Targets 068 through 070 and three entries from the ASD. The yellow dots represent ASD targets and green dots represent Targets 068 through 070.

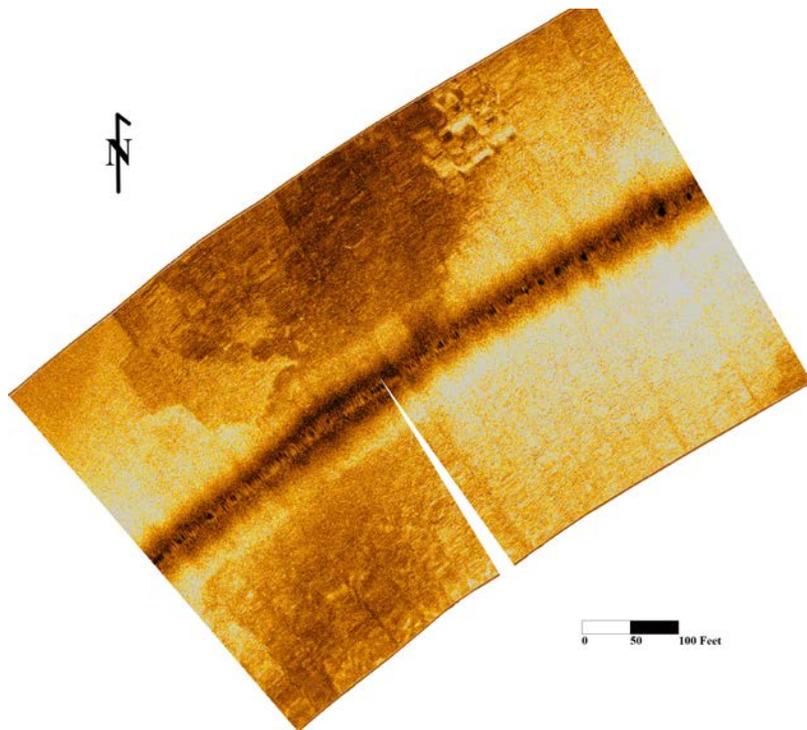


Figure 50. Survey line of ASD entries within Survey Area 6.

The targets were approached from both an E to W and NE to SW direction, using a range of both 75 m (246 ft) and 50 m (164 ft), but targets from both the ASD database and regional study (Watts 2014) could not be identified. Target 070 was located; however, it appears to be most likely irregular seafloor or different sediment type, and not cultural. There could have been other issues affecting the outcome of the side scan sonar results, including improper or inexact location of the research vessel to the regional study coordinates, but the number of passes over both a charted shipwreck site with no cultural evidence observed most likely discounts this possibility. As a result of not locating any potential cultural targets in Survey Area 6, no further dive operations or sector scanning surveys were planned. Due to the lack of evidence for archaeological remains at Targets 068 through 070, no further investigations of Survey Area 6 are recommended.

Survey Area 7: Target 085

As originally identified, Survey Area 7 is comprised of one SSS target, Target 085 from the regional survey, and two entries from the ASD, both of which are listed as vessels. No magnetic anomalies are co-located with the cluster. The survey area measures 0.09 square km in area. The distance from the nearest ASD entry to Target 085 extends 27 m (88 ft).

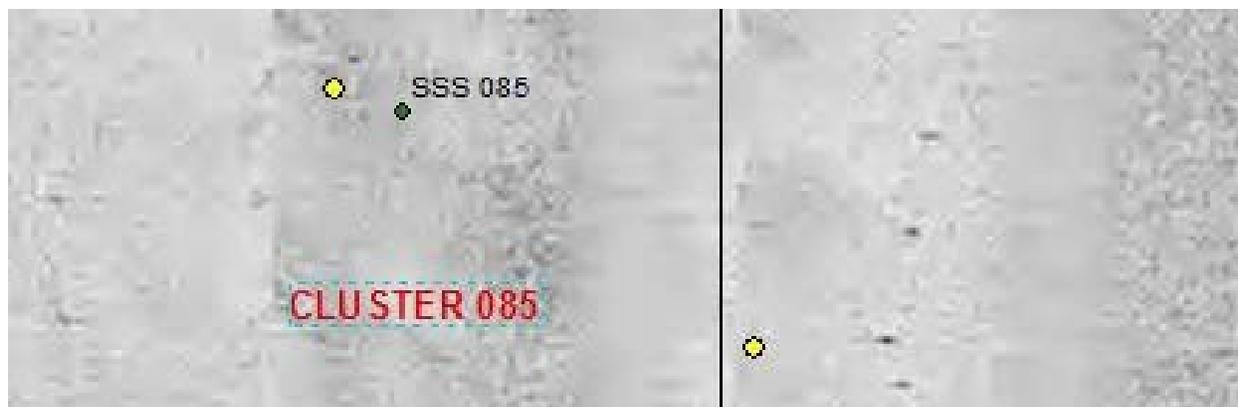


Figure 51. Survey Area 7, comprised of regional survey Target 085 and two entries from the ASD. The yellow dots represent ASD targets and the green dot represents Target 085.

There are two vessels associated with this survey area, one named and the other unknown. Remains of *Elizabeth Palmer* are listed within this survey area and a brief description of *Elizabeth Palmer* is located in the results section of Survey Area 1: Cluster 034, above. The second vessel associated with this survey area is unknown and there is potential it is also remains of *Elizabeth Palmer*, having broken up during the wrecking event with *Washingtonian*. There is also potential for it to be a completely different wreck entirely.

Using limited background information, survey operations at Survey Area 7 began on 8 July 2015 with side scan sonar passes over Target 085. As originally identified, Target 085 measured 3.41 m (11.19 ft) in width and 6.38 m (20.93 ft) in length. There were no associated magnetometer anomalies within Survey Area 7. On 8 July 2015, a total of 2 side scan sonar passes were completed over Target Area 7. The target locations were approached from SE to NW direction, using a range of 75 m (246 ft). Following side scan survey operations of Survey Area 7 (Figure

52), it could not be determined whether or not the observed features were cultural or geological in nature.

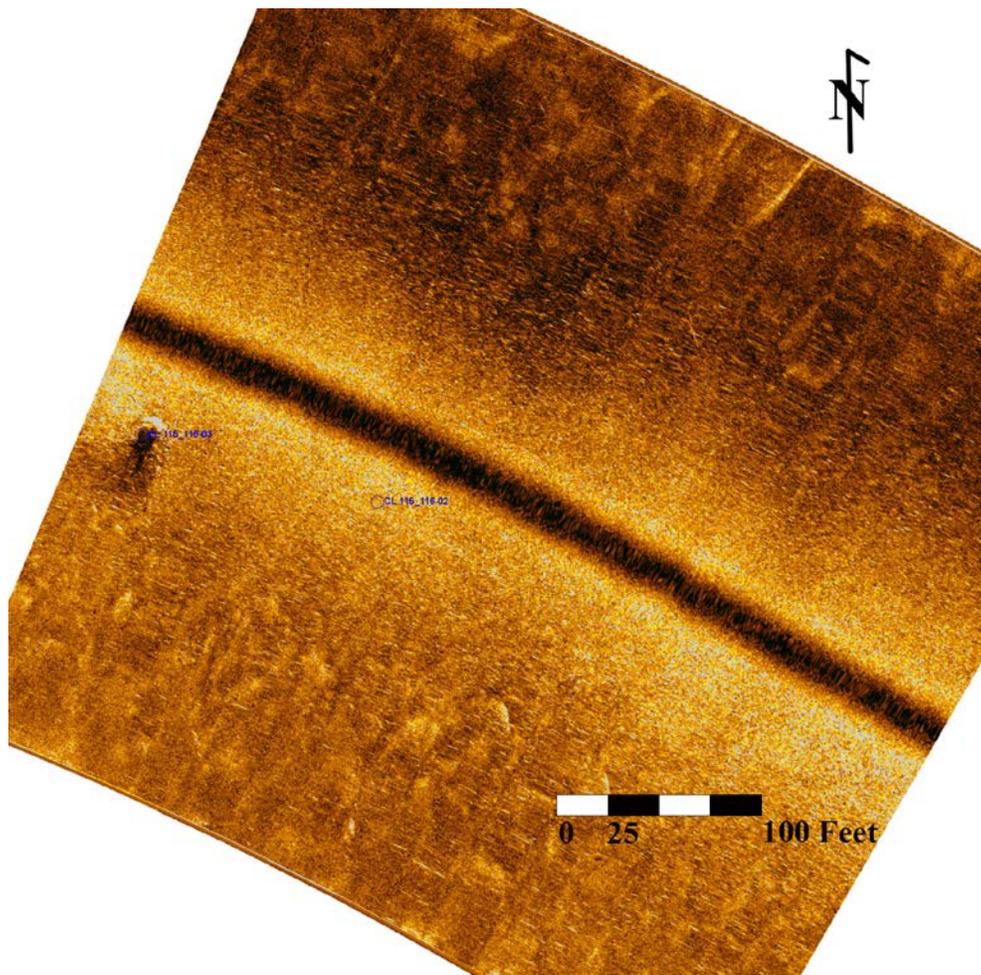


Figure 52. Survey line of Target 085.

Target 085 measured 20.78 ft (6.33 m) in length and 16.96 ft (5.17 m) wide. Conclusive evidence of cultural remains could not be determined by side scan survey alone. Dive operations were planned to further investigate the site, which took place on 12 July 2015. Only one dive rotation was conducted to investigate the remains. During this dive, operations focused on examining the overall site for further documentation, noting the size and the amount of relief that was visible with video and still photography (Figures 53 to 55).

At a depth of 16 m (54 ft), diver observations confirmed the existence of cultural remains. The object was identified as a pile of chain, with other disarticulated metal wrapped inside the chain. This was the only object identified on the seafloor at Target 085 and no additional evidence was observed indicating the presence of a hull or other archaeological remains. As a result of positively identifying the evidence at Target 085 as being isolated marine debris, no further dive operations or sector scanning surveys were planned. No further investigation is recommended at this site and the objects at Target 085 are not eligible for listing to the National Register.



Figure 53. Divers inspecting Target 085.



Figure 54. Close up, plan view of Target 085.



Figure 55. Diver inspecting pile of chain that is Target 085.

Survey Area 8: Target 014

As originally identified, Survey Area 8 is comprised of three SSS targets (013, 014, and 015) from the regional survey. No magnetic anomalies are co-located with the cluster. The original surveyors identified these targets as possibly associated with vessel remains. Local fishermen rank this area as among the most important within the WEA. The survey area measures 0.001 square km in area and is located east and outside of the WEA.

There are no charted shipwreck sites within Survey Area 8, however, there was a large object identified within the regional study, Target 014. Using this object as the focal point for investigation, survey operations at Survey Area 8 began on 10 July 2015 with side scan sonar passes over targets 013 through 015. As originally identified, Target 014 was one of the larger sites, measuring 40.09 m (131.53 ft) in width and 65.86 m (216.08 ft) in length. There were no associated magnetometer measurements within Survey Area 8. On 10 July 2015, a total of two side scan sonar passes were completed over Survey Area 8 with varying degrees of success. The targets were approached from E to W, using a range of 50 m (146 ft). Following side scan survey operations, initial analysis of Survey Area 8, and specifically Target 014 (Figure 57) could not determine whether or not features were cultural or geological in nature.

Target 014 measured 8.66 m (28.43 ft) in width and 10.64 m (34.91 ft) in length. Evidence did not give clear indication of a cultural resource and further investigation of the site was warranted. Target 014 was selected for a sector scan survey. Two drops of the sector scanning sonar on 13

July 2015 provided imagery of potential shipwreck debris or a ballast pile. The sector scan sonar set at a 75-m (246-ft) range successfully acquired images of Target 014 (Figure 58).

Evidence from the sector scan imagery did not conclusively rule out indicators for submerged cultural resources. There were minor objects that had slight relief that were located in close proximity to each other. Further examination of the site was warranted. In an effort to examine Target 014, dive operations first took place on 17 July 2015. One dive was planned for this site with the focus of operations on examining overall site conditions for further documentation. Documentation of the site included use of video and still photography (Figures 59 and 60). The site was at a depth of 30 m (100 ft).

Divers confirmed the formation as a geological hard bottom feature. As Target 014 was conclusively determined to be geological, no further dive operations or sector scanning surveys were planned. No further investigation is recommended at this site and the remains are not eligible for listing to the National Register.

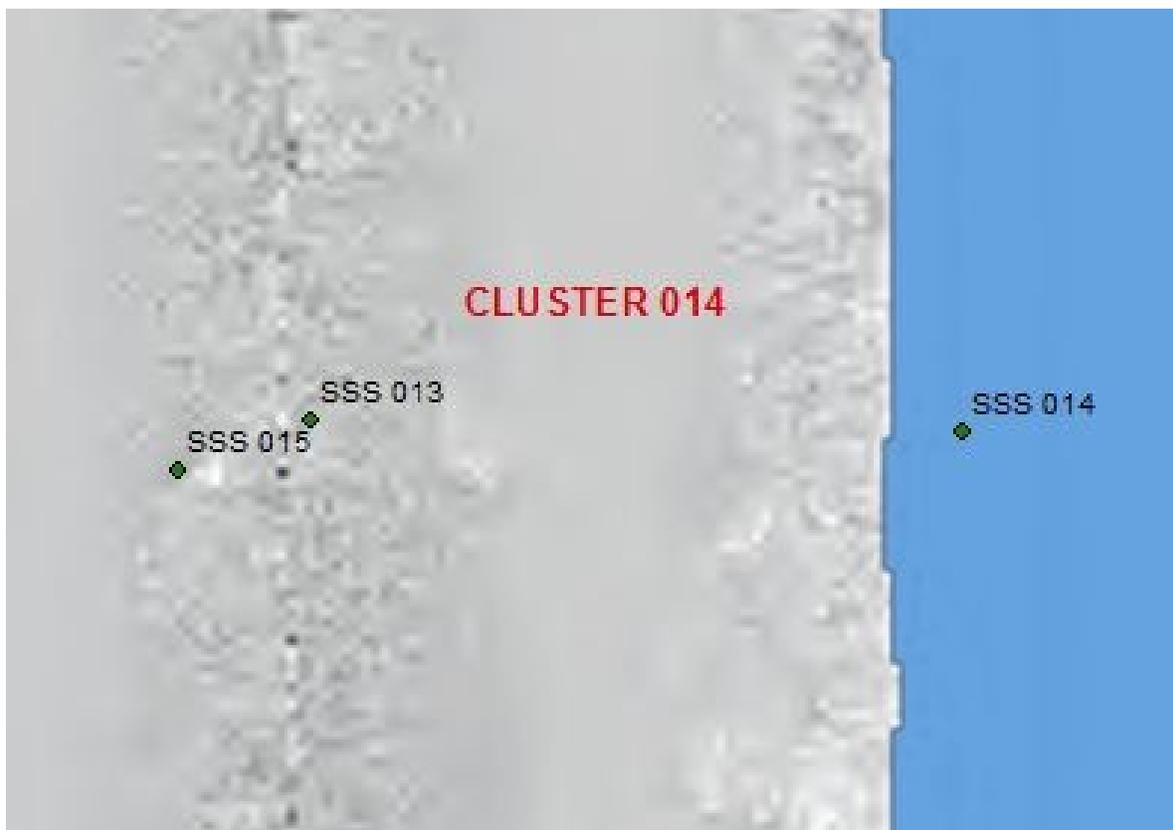


Figure 56. Survey Area 8 is comprised of regional survey Targets 013 through 015 and no entries from the ASD. The green dots represent Targets 013 through 015.

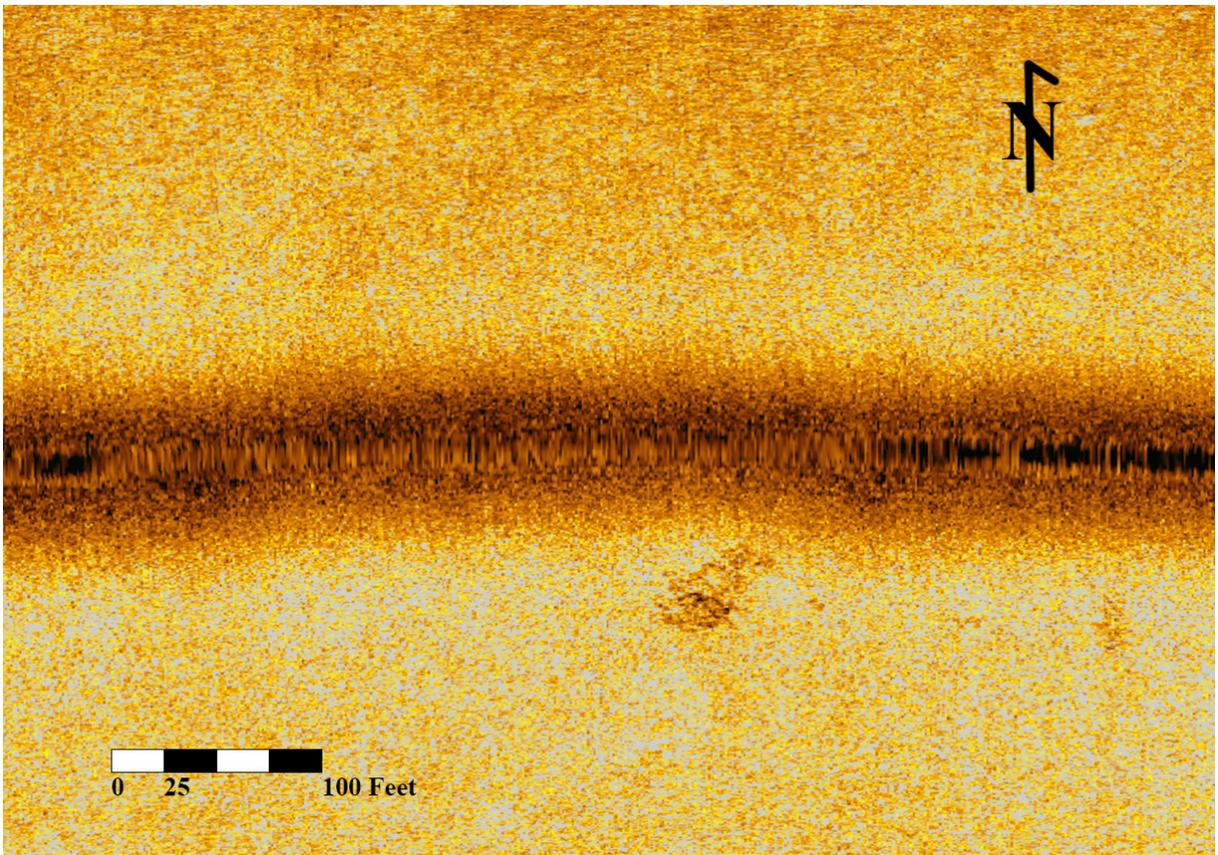


Figure 57. Survey line depicting Survey Area 8, Target 014.

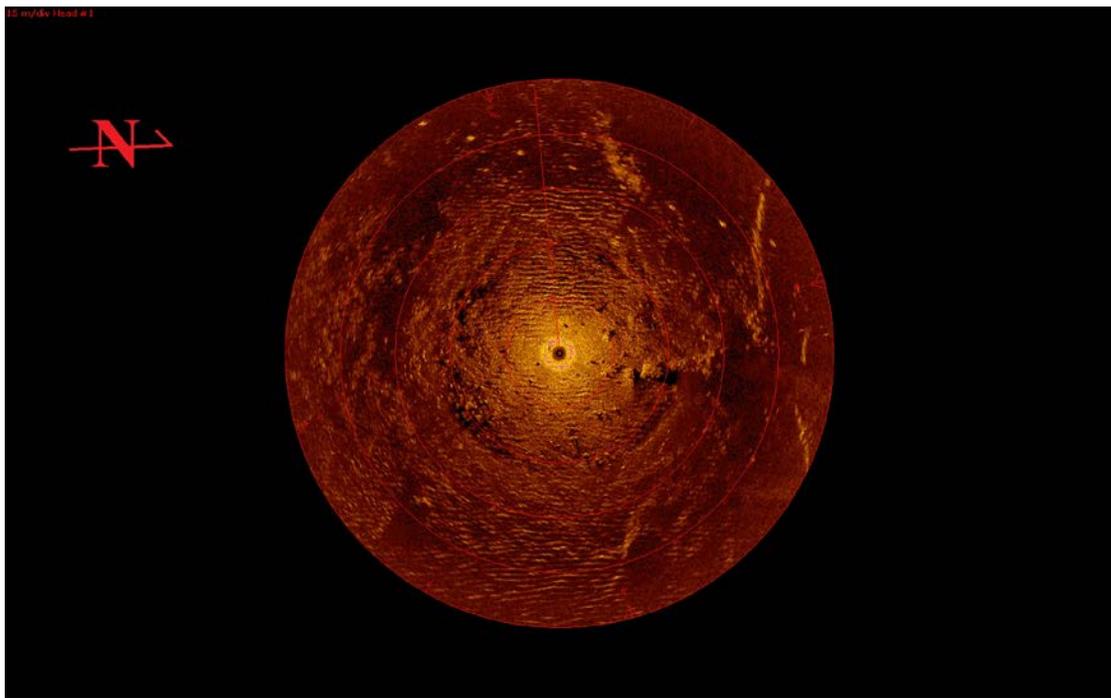


Figure 58. Sector scan sonar image depicting Target 014 at 75 m (246 ft), 360 degrees.



Figure 59. Geological feature encrusted in marine growth at Target 014 (J. McCord - CSI).



Figure 60. Target 014 displaying a vibrant ecological habitat (J. McCord - CSI).

CONCLUSIONS AND RECOMMENDATIONS

The study investigated eight priority target areas in and near the MD WEA (Table 2). Archaeological sites were identified at four of these areas and avoidance and additional investigations are recommended. No further investigations were recommended for the remaining four sites as they were determined to not represent archaeological resources or they are not eligible for listing in the NRHP.

Table 2. Matrix of Survey Areas and Recommendations

Survey Area	Tentative Identification and Description	Recommendation
1	Large, metal-hulled shipwreck identified. Potential candidates for identification include the <i>Washingtonian</i> and <i>W.L. Steed</i> .	Avoidance of this target by a distance of 50.0 m (164 ft) from the discernable extent of the hull remains. Additional investigation recommended to confirm site identify and assess National Register Eligibility.
2	Wooden-hull shipwreck remains and associated debris identified, may be two shipwrecks at location.	Avoidance of Target 038 by a distance of 100 m (328 ft). Additional investigation recommended to examine associated SSS targets 39, 40 and 41; delineate site boundaries; and assess National Register Eligibility.
3	Composite built shipwreck remains identified.	Avoidance of Target 071 by a distance of 50.0 m (164 ft). Additional investigation recommended to examine associated SSS targets 72, 73 and 74 and assess National Register Eligibility.
4	Shipwreck remains identified in addition to other indeterminate features in vicinity.	Avoidance of individual SSS Targets 029, 030 and 031 by a distance of 50.0 m (164 ft) until additional investigations may be conducted to examine associated SSS targets and assess eligibility for listing on the National Register.
5	Geological formation, does not represent the presence of an archaeological resource.	No further investigations.
6	Irregular seafloor, does not represent the presence of an archaeological resource.	No further investigations.
7	Isolated debris (pile of chain), does not represent the presence of an archaeological resource.	No further investigations.
8	Geological formation, does not represent the presence of an archaeological resource.	No further investigations.

The eight areas investigated during the course of this study presented a wide range of materials and resources. The methodological approach maximized assessment time and allowed the survey team to collect a great deal of data to aid in the preliminary interpretation and evaluation of sites in a short period of time. There is potential for one of the sites reported in the area *W. L. Steed*, to be included under an established multiple property designation for Battle of the Atlantic associated resources; however, further investigation at this site is necessary for proper identification of the remains.

Other sites, which have no known or tenuous identities, may also represent historic resources worthy of further investigation and condition monitoring. The sites of the suspected *Washingtonian* and *Elizabeth Palmer*, if proven definitively, are associated with a historically significant event and should be considered potentially eligible for the NRHP. Further research would be required to demonstrate the identity and National Register eligibility conclusively.

As this was a preliminary investigation, only a general description of the sites' environment was conducted. Depending on future management strategies, it may be valuable to establish more concrete scientific descriptions of the environment and ecosystems present at each site. Water quality and characteristics at each site would aid in the study of corrosion potential and preservation of wooden hull remains and help researchers understand more accurately the various site formation processes acting on these sites. Additionally, subsequent efforts should be made to monitor impacts of nearby construction activities and associated scour, sediment transport, and sediment mobility on ongoing site formation processes.

Finally, this study was highly efficient at ground-truthing possible targets of archaeological interest in order to verify true sites and reject false positives identified in developer datasets. It is recommended that the methods herein employed (ground-truthing, documenting, and monitoring) be applied for other wind energy planning areas. Based on lessons learned in Europe concerning knowledge lost when possible anomalies are given avoidance buffers but not investigated, it may be valuable to undertake this initiative for other wind energy areas.

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The Bureau of Ocean Energy Management (BOEM) works to manage the exploration and development of the nation's offshore resources in a way that appropriately balances economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development and environmental reviews and studies.