

Mapping the 1860 Wreck of the US Coast Survey Vessel Robert J Walker

Published in AAUS Diving for Science Symposium Program. Sept 28-Oct 3rd, 2015

Peter F. Straub^{1,*}, Stephen D. Nagiewicz^{1,2}, Vincent Capone³, Daniel Lieb² and Steven P. Evert¹

¹ Stockton University, 101 Vera King Farris Drive, Galloway, NJ 08205 USA

peter.straub@stockton.edu

² New Jersey Historical Divers Association. 2201 Marconi Dr., Wall, 07719, USA

³ Black Laser Learning, PO Box 339, Hockessin, DE 19707, USA

* presenting and corresponding author

Abstract

The Robert J Walker is an iron hull, paddlewheel steamship that saw service in the US Coast Survey, predecessor to the NOAA Office of Coast Survey, before it was lost with 20 men after a collision at sea off Atlantic City, NJ in 1860. The wreck was positively identified in 2013 by NOAA and subsequently placed on the US National Parks Service, National Register of Historic Places. To further document and protect the site, NOAA requested that a consortium of non-governmental groups undertake the archaeological site work as a cooperative operation between governmental, non-governmental and academic institutions to preserve our national maritime heritage. This consortium included local divers, represented by the New Jersey Historical Divers Association (NJHDA), Stockton University and Black Laser Learning, a marine survey and education company. Side scan and bathymetric surveys were undertaken with a Klein 3900 digital side scan sonar and an Edgetech 6205 multi-beam bathymetric sonar. A Seabotix LBV was deployed for remote video survey. Divers from the NJHDA thoroughly surveyed the site over a weeklong expedition, taking precise measurements, underwater photographs and video. Geo-referenced bottom maps were constructed from mosaics of the sonar data and digitized wreck features in ARC-map. Integration of data from multiple sensors allowed reconstruction of the site with digital CAD drawings to produce rich multi-layered GIS products to support conservation of this historic site and to promote its use in the dive community.

Keywords: wreck, Robert J. Walker, mapping, sonar, archaeology

Introduction

The United States Coast Survey Steamer (U.S.C.S.S.) Robert J. Walker was among the first iron hulled, paddlewheel, steamer vessels to see service in the United States Coast Survey, now the National Oceanic and Atmospheric Administration (NOAA), Office of Coast Survey (Figure 1.). She was initially built in 1847 as part of an experimental series of eight vessels commissioned by the Revenue Marine Service, the precursor service to today's Coast Guard, as revenue cutters. The Walker, like two other of her sister ships, was deemed too large and too slow to be effective in the Revenue Marine Service and was given over the Coast Survey in 1848 where they saw more success as hydrographic vessels. The Walker was instrumental in bathymetric survey of Mobile Bay the Gulf and southeast coast of the United States in the decade prior to the outbreak of the US Civil war. This information was vital to the later effectiveness of the wartime blockade strategy. In addition, the Walker contributed to updated charts of the Gulf Stream (Delgado, 2013). While headed north for repairs in New York City, the Walker collided at night in a gale with the commercial schooner Fanny and sank off of Absecon Island, Atlantic City, New Jersey approximately 10 miles west of the Atlantic City lighthouse which was operational at the time and referenced in survivor accounts. Twenty lives were lost directly in the sinking with one further succumbing shortly thereafter to injury in the wreck. In the confusion of the



Figure 1. Painting of the U.S.C.S.S Robert J. Walker by W.A.K. Martin, 1852 (courtesy of the Mariners Museum, Newport News, VA) and commemorative plaques (r) placed in memorial at the lighthouse, Atlantic City, NJ June 21, 2015 by the National Oceanic and Atmospheric Administration (photos S. Nagiewicz)

sinking and in the subsequent entry of the country into civil war, the actual site of loss was not determined, no salvage was attempted and the wreck site remained a mystery for 153 years (Theberge, 2007; Forsythe, 2013).

Following up on local diver accounts, Joyce Steinmetz of East Carolina University and the Maritime Heritage Program, NOAA Office of Marine Sanctuaries narrowed the possible sites of the RJ Walker sinking to a site known to local south Jersey divers as the \$25 wreck, ostensibly named as the numbers of the wreck were sold for this price. In response to the recent hurricane Sandy on the east coast, NOAA Coast Survey was scheduled for the local area and took the opportunity to survey several likely wreck sites. The NOAA team, including sonar, bathymetry and divers, was able to positively identify the \$25 wreck as the U.S.C.S.S. Robert J Walker in the summer of 2013 based particularly on a number of characteristics including its unique steam engines and paddlewheel designs (Isherwood, 1852; Delgado, 2013).

The Robert J. Walker site was placed on the National Register of Historic Places by the National Park Service in 2014 to recognize the historic nature of the wreck site and to preserve the artifacts at the site while still allowing local divers to access the site. The Maritime Heritage Program of NOAA Office of Marine Sanctuaries (NOAA-OMS) decided on this course of action in lieu of designating the site a Marine Sanctuary which would have severely restricted access to only permitted researchers (Delgado, 2013). To help conserve and curate the Robert J. Walker Historic Site, the Maritime Heritage Program-NOAA-OMS enlisted the aid of a consortium of groups including local divers represented by the New Jersey Historical Divers Association (NJHDA), academic institutions represented by Stockton University and experts in underwater operations represented by Black Laser Learning. The charge of this group was to put together a community based expedition that would perform an archaeological survey of the Robert J. Walker historic site and produce base maps and a photographic and video record that could be used to monitor and conserve the site over time. The group operated under the flag of the Explorers Club, New York, New York and the Club's historic Ocean Flag #132 flew over the expedition.

Methods

Remote Sensing

Remote sensing was undertaken at the Walker site from the Stockton University vessel the RV Gannet from May to July 2014. Geo-referenced side scan sonar was used to characterize the Walker wreck and delineate the site. An L3/ Klein 3900 digital side scan was towed over the site at 445 kHz and 900 kHz frequencies to locate and to image the wreck. Side scan data was processed in Sonar Pro 12.1 (L3/Klein, Salem, NH) software and mosaics of the site produced in Sonar Whiz 5 (Chesapeake Technologies, Mountain View, CA) software. Bathymetric data was collected with an Edgetech 6205 (Edgetech West Wareham, MA) multi-phase echosounder bathymetric sonar and processed with Hypack 2014 (Hypack, Middletown, CT) hydrographic survey and processing software. Video was recorded of the site with a Seabotix LBV-300 S5 remotely operated vehicle.

Dive Operations

Divers from the New Jersey Historical Divers Association (NJHDA) dove the site for preliminary analysis in May 2014. From this initial dive and from analysis of remote sensing data, a weeklong expedition was planned for August 2014. Divers were assigned to teams and data collection on specific sections of the wreck. A centerline tape was pulled over the wreck from bow to stern and the individual sections of the wreck measured in great detail to produce initial drawings and size calculations. The wreck was extensively photographed and video taken to document the individual wreck components and their positions.

Mapping

All geo-referenced sonar and bathymetric mapping data exported as geo-Tiff files were assembled as layers in ARC-GIS/ARC-MAP 10.2 (ESRI, Redlands, CA). Shape files were produced by digitizing sonar images to delineate and map wreck components and produce a site map layer. Diver collected data was used to produce a site map of the wreckage and a detailed computer assisted drawing of the ship mechanisms, boilers, engines, drive, paddles was produced. Initial drawings of intact components, based on in some cases the original specifications for the parts, i.e. Isherwood (1852), were deconstructed to indicate their current deteriorated or damaged situation based on diver measurements and photographs. 3-D drawings were done in Google Sketch Up Pro 2014 (Google, Mountain View, CA), Adobe Photoshop and Adobe Illustrator, (Adobe, San Jose, CA).

Results

Initial characterization of the site was undertaken with side scan sonar and a mosaic of the site developed. Bathymetry of the site showed, as did the side scan, that the wreck was located in a depression (28 m) compared to the surrounding bottom (25 m) that is probably the result of 150 years of scour based on currents being deflected by the wreckage (Figure 2). This depression tends to accumulate silty particles that can make visibility at the site difficult when there is any significant swell. A preliminary site map was drawn from the sonar images in Arc-Map to locate the prominent landmarks of the wreck (Figure 2). Low pass, high frequency (900 KHz) side scan sonar data more clearly images portions of the wreck as seen in Figure 3. The bow stern and engine details are matched with photos from the diver survey to get a better picture of the overall wreck site (Figure 3). The bow is bent back and broken off indicating it probably hit the bottom first. Imagery of the drive train (figure 4) shows

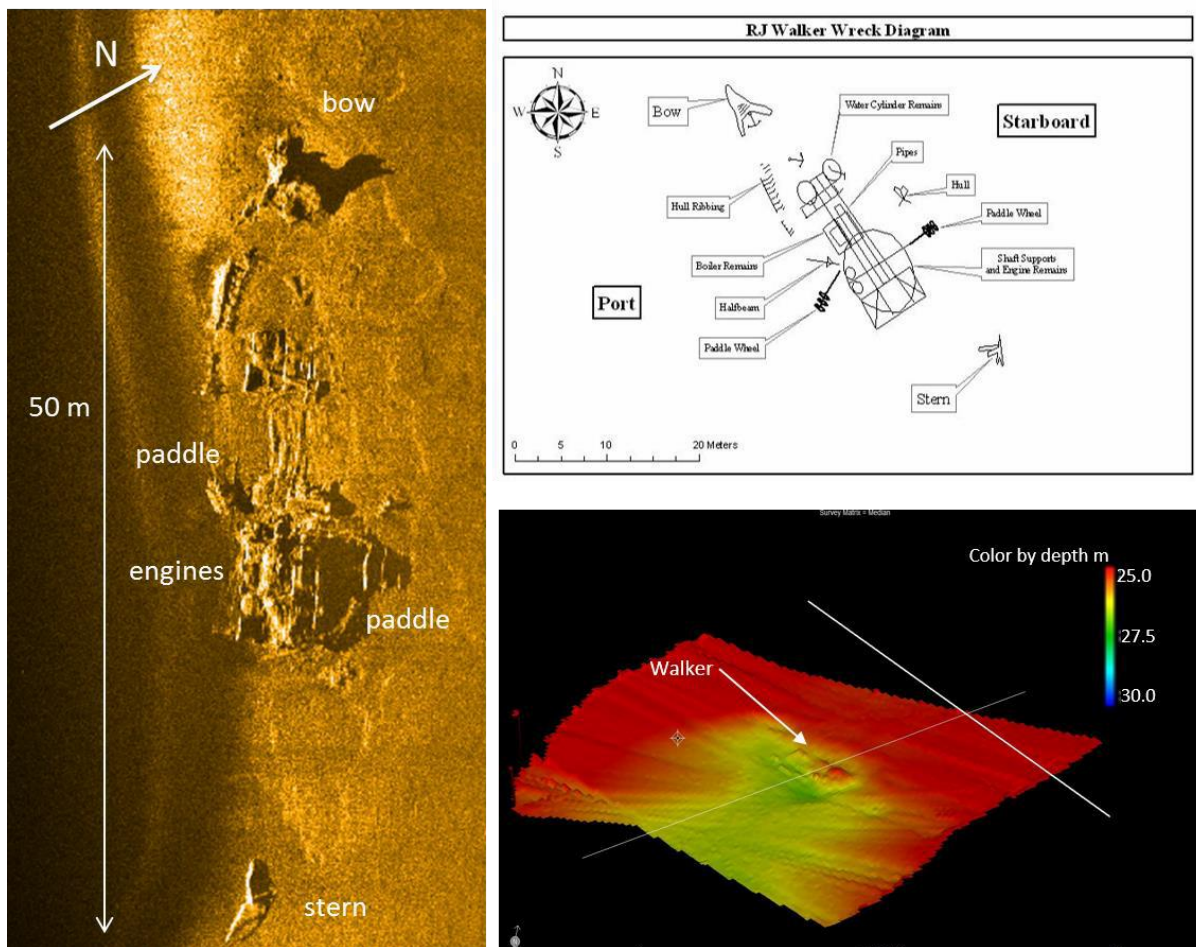


Figure 2. Robert J. Walker site maps including high frequency 900 kHz, 40 m range, side scan sonar (L), bathymetry (bottom R.) and wreck diagram developed from sidescan sonar data (top R.).

that the starboard paddle is still articulated to the drive mechanism while the port paddle has essentially been broken free and probably impacted the bottom with enough force to bend the hub. The final 3-D reconstruction of the U.S.C.S.S. Robert J. Walker is shown in Figure 5. The wreckage is shown in its current configuration and to 3-D scale and will be particularly useful in future comparative studies.

Discussion

Detailed maps of the U.S.C.S.S. Robert J. Walker wreck site produced from this project will serve dual roles. First, the mapping products will serve as a scientific baseline for historic conservation of the wreck site. Second, the mapping products are also being used as educational tools and as the basis for displays at a number of educational venues including NOAA headquarters, Silver Springs, the Atlantic City Lighthouse, Stockton University, the New Jersey Maritime Museum, and the New Jersey Historical Divers Association Shipwreck Museum. A diver's slate for use of the sport diving community is being produced to summarize the mapping information and site plan and to inform the diving public of the significance of the site and of its preservation status.

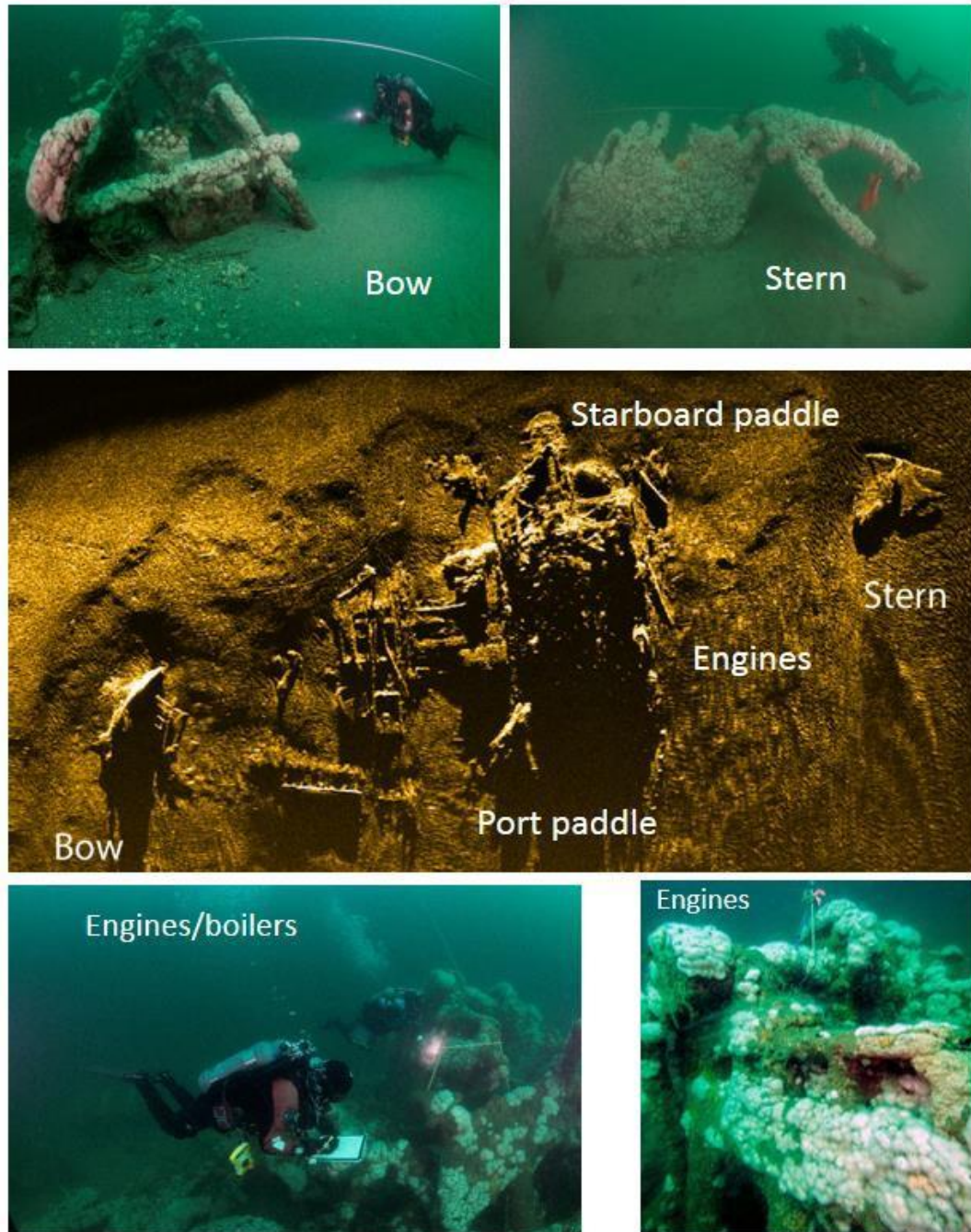


Figure 3. Side scan sonar, high frequency 900 kHz (center). Underwater photos from the dive team, top left is the bow, top right is the remains of the stern, bottom left and right are the engines and boilers amidships (photos J. Hoyt).

The model of community engagement that the NOAA-OMS Maritime Heritage Program has chosen to pursue in the historical conservation of the U.S.C.S.S. Robert J. Walker resulted in buy in from the diverse stakeholder groups including local government, U.S. government scientists and archaeologists, amateur archaeologists, academic scientists and archaeologists, sport divers and fishers and the general public. By following this path, the Maritime Heritage Program has designated the site as a registered Historic Place, alerted the public to its role in preserving historic places and at

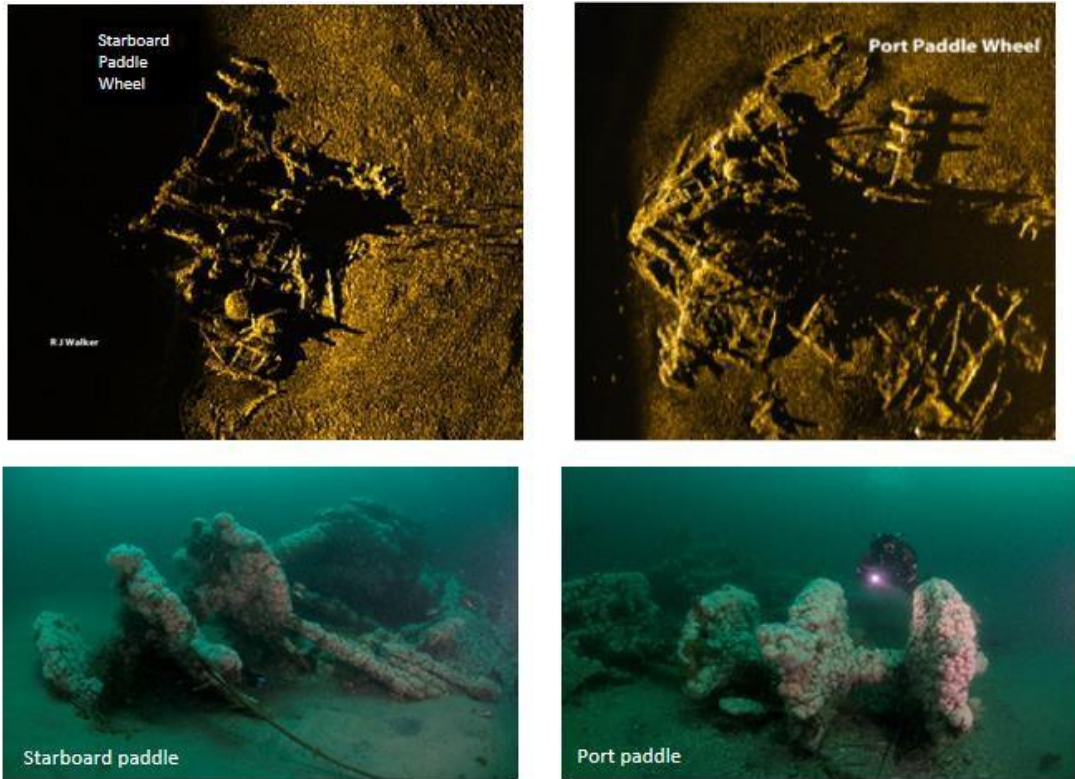


Figure 4. Side scan imagery (900 kHz) of the starboard (L) and port (R) drive trains and paddle wheels. Below are the diver photos of the same (photos J. Hoyt).

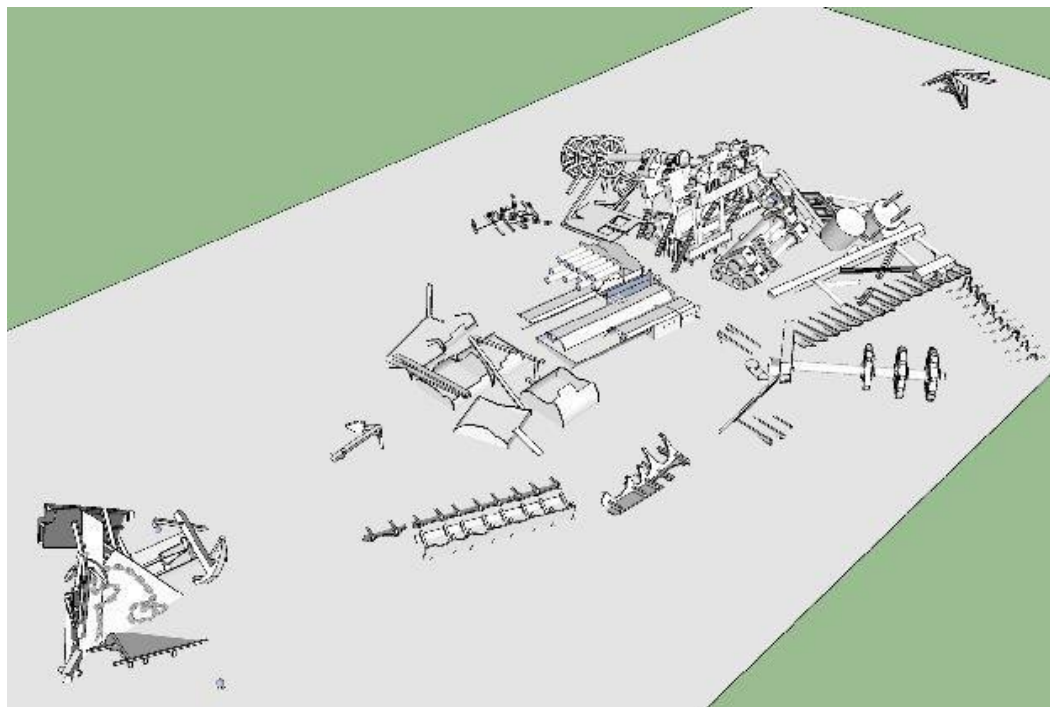


Figure 5. Final 3-D reconstruction of the Robert J. Walker wreck site using dive measurements, photos, videos and sonar to produce a representation of the wreckage in its current configuration.

the same time honored the memory of the twenty-one Coast Survey personnel who lost their lives in the service of their country. The fact that this project used advanced hydrographic survey technology is a testament to their pioneering contributions. On June 21st, 2015, on World Hydrographic day, NOAA officially honored the memory of the crew lost in the tragic disaster in a ceremony at the Lighthouse in Atlantic City, NJ, perhaps the last sight of land they saw in life. At the lighthouse is a mosaic compass rose with embedded plaques (Figure 1.) honoring the crew and dead of the U.S.C.S.S. Robert J. Walker so that their memory and our debt to them will not be forgotten.

Acknowledgments: The authors acknowledge the contributions of the expedition divers: Dan Lieb, Steve Nagiewicz, Joyce Steinmetz, Joe Hoyt, Matt Lawrence, Herb Segars, Harry Roecker, Matt Nigro, Joe Fiorentino, Mike Haas, Mike Pizzio, Mike Lavitt, Shawn Sweeney, Matthew Partrick, Howard Rothweiler, Al Vogel, Ryan Beatty and the dive expedition surface support team: Paul and Ruth Hepler/ Venture dive, Ronnie Segars, Jim Delgado and technical support Harry Roecker. Project support provided by Edward Marsh, Ryan Beaty, Travis Nagiewicz and Howard Rothweiler. Sponsors support was provided by Stockton University, The Revel Hotel and Casino, Black Laser Learning and the Maritime Heritage Program in NOAA's Office of National Marine Sanctuaries. Stockton University students, Jamie Taylor, Chelsea Shields, Walter Poff and Emily Burnite contributed to the project as well as the crew of the RV Gannett, Nathan Robinson, Elizabeth Zimmermann and Mark Sullivan. This expedition carried flag #132, Ocean flag of the Explorers Club, New York City, NY.

Literature Cited

Delgado, J. P. 2013. Identification of the Wreck of the U.S.C.S.S. Robert J. Walker off Atlantic City, New Jersey. NOAA's Office of National Marine Sanctuaries, Silver Spring, Maryland. 56 pgs
http://www.lib.noaa.gov/noaainfo/heritage/coastandgeodeticsurvey/RobertJWalker_Preliminary_Archaeological_Report-NOAA.pdf

Forsythe, D. 2013. The Story of the Coast Survey Steamer ROBERT J. WALKER. NOAA Office of Coast Survey, Coast Survey Communications. 9 pgs
<http://www.nauticalcharts.noaa.gov/RobertJWalker/misc.html>

Isherwood, B.F. 1852. Notes on the U.S. Surveying Steam Walker. *Journal of the Franklin Institute*, Third Series 24(1):49-55.

Theberge, A. 2007. The Coast Survey 1807-1867; Collisions. NOAA Central Library
<http://www.lib.noaa.gov/noaainfo/heritage/coastsurveyvol1/BACHE5.html#COLLISION>