

Mapping the *F.W. Abrams*



Divers with the Battle of the Atlantic Research and Expedition Group (BAREG) map the *F. W. Abrams*. The data collected will be used to create a detailed site plan of the wreck site. Photo: Bill Chadwell and Eric Brooks (BAREG)

Just off the Outer Banks of North Carolina lie dozens of ships that sank during World War II's Battle of the Atlantic, one of the longest and most decisive campaigns of the war. Since 2008, NOAA and its partners have worked to document these shipwrecks to better understand their history and importance to our nation.

This summer, one of these shipwrecks, *F.W. Abrams*, was surveyed and documented through a collaborative effort between NOAA, Bureau of Ocean Energy Management (BOEM) and a group of avocational divers with the Battle of the Atlantic Research and Expedition Group (BAREG). Together, the divers worked to collect data for a detailed site plan of the archaeological site and documented the remains with photos and videos.

F.W. Abrams, an oil tanker, sank on June 15, 1942, while transiting off Cape Hatteras, N.C., out of a minefield that had been laid to offer Allied and merchant ships refuge from German U-boats patrolling the area. The ship sank in shallow water and close to shore making it a popular dive site.



To learn more about *F.W. Abrams* and other shipwrecks surveyed by NOAA, visit <http://monitor.noaa.gov/shipwrecks/welcome.html>.

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To receive notices about new issues or to provide feedback on this publication, contact us at monitor@noaa.gov or 757-591-7328 and provide your email address. All information received is held securely and not released to any outside organization or individual.



New ANCHOR Partners

We welcome our three newest ANCHOR operators, Discovery Diving, Rum Runner Dive Shop and Under Pressure Diving. The ANCHOR (Appreciating the Nation's Cultural Heritage and Ocean Resources) program is an outreach and conservation initiative with a mission to work in partnership with dive businesses and charter operators to reduce human impacts on shipwrecks and other maritime heritage resources.

The Monitor National Marine Sanctuary is committed to working with the State, local community and divers to preserve and promote North Carolina's maritime heritage. One of the most powerful ways to protect North Carolina's shipwrecks for future generations is by educating local businesses on the value of shipwrecks as historic and economic resources and giving them tools to interact with them responsibly.

To learn more about the ANCHOR program, visit <http://monitor.noaa.gov/involved/anchor.html>.

For information on how to become an ANCHOR operator, contact Tane Casserley at Tane.Casserley@noaa.gov.

Current ANCHOR Operators



Click to visit [Discovery Diving's](#) web site.



Click to visit [Roanoke Island Outfitters and Dive Shop's](#) web site.



Click to visit the website for [Rum Runner Dive Shop](#)



Click to visit the website for [Under Pressure Diving](#)



Dixie Arrow wreck site. Photo: Hoyt, NOAA

Photo Contest!

NOAA's Monitor National Marine Sanctuary is launching a shipwreck photography competition that aims to showcase and celebrate North Carolina's rich and diverse maritime heritage.

Photographers from all over the world are invited to submit their best photos of any shipwreck or other maritime heritage resource located above or below North Carolina's waters.

Winners receive their choice of a framed North Carolina shipwreck site plan created by NOAA archaeologists and their partner organizations. To view site plans currently available, visit http://monitor.noaa.gov/shipwrecks/site_plans.html

Photo Categories

Photos will be accepted from May 1 to November 1, 2016, in the following categories:

- A. Underwater shipwreck
- B. Shipwreck above water
- C. Maritime archaeological site other than shipwreck
- D. Macro photography involving maritime heritage
- E. Wildlife and maritime heritage

How to Enter

Submit your completed [Entry Application](#) and images (minimum of 1200 pixels wide) to monitor@noaa.gov. All images MUST include the following information: photographer's full name, contact details, the category the image is being submitted to and the name and location of the site.

Photo entries will be highlighted on the Monitor NMS's [website](#) and on our [Facebook page](#). The winning photos will be announced in December 2016.

For additional contest rules and to download an application, visit <http://monitor.noaa.gov/imagery/contest.html>

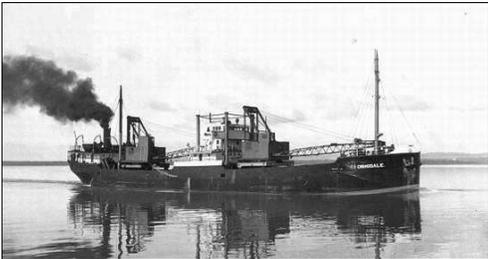
Exploring World War II's Battle of the Atlantic off North Carolina's



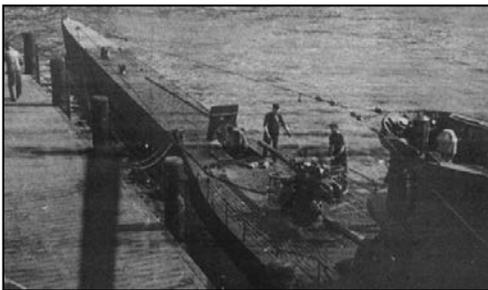
Project Baseline's research vessel, *Baseline Explorer*.
Photo: Courtesy of Project Baseline



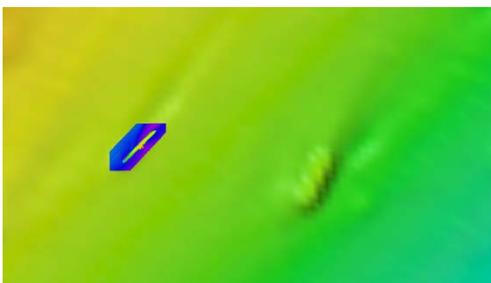
Triton 1000/2 submersible will serve as the primary instrument platform. Photo: Project Baseline



SS Bluefields when it operated under the previous name, *Ormidale*. Photo: Historical Collection of Bowling Green State University



U-576 while docked at a pier. Photo: Courtesy of Ed Caram



From August 22 to September 6, 2016, NOAA's Office of National Marine Sanctuaries, Project Baseline, NOAA's Office of Exploration and Research, the Bureau of Ocean Energy Management and other partners plan to study the remains of two World War II shipwrecks that were involved in a battle off North Carolina during the Battle of the Atlantic campaign. The research is part of an ongoing research project to document and highlight a little-known but important chapter in North Carolina's maritime history.

In July 1942, German submarine [U-576](#) sank the freighter [SS Bluefields](#) during the battle of Convoy KS-520 off Cape Hatteras, N.C. The convoy and its U.S. military escorts fought back, sinking the U-boat. In 2014, NOAA discovered the two vessels 35 miles offshore in 700 feet of water, about 200 yards apart.

The 2016 Battle of the Atlantic expedition builds on previous work by NOAA to document nationally-significant shipwrecks in the "Graveyard of the Atlantic" off North Carolina's Outer Banks. This year's research team is composed of a diverse group of partners, including Project Baseline, a global conservation non-profit that is providing its research vessel, the *Baseline Explorer* and two manned submersibles that will be used to collect video and still images, and perform other tasks.

Advanced remote sensing technologies and underwater robots provided by 2G Robotics and SRI International, will be used to generate bathymetric data and detailed acoustic models of the wreck sites and surrounding seafloor habitat.

Other partners on the expedition include NOAA's National Centers for Coastal Ocean Science and the University of North Carolina's Coastal Studies Institute.

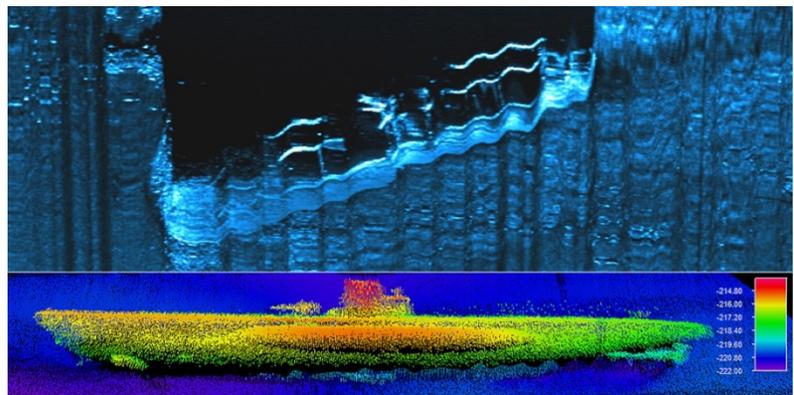
SS Bluefields and U-576 are two of the shipwrecks being considered in an expanded sanctuary proposed in 2015. To learn more about the proposed expansion, visit <http://monitor.noaa.gov/management/expansion.html>.

Be sure to follow the expedition on NOAA's Ocean Explorer website <http://oceanexplorer.noaa.gov/> where daily updates will be posted.

Also, follow the expedition on Monitor National Marine Sanctuary's social media sites:

 Facebook: <https://www.facebook.com/Monitor-National-Marine-Sanctuary-7510157792/>

 Twitter: <https://twitter.com/monitornms>



Left: Multibeam sonar imagery collected in 2014 shows the relative positions of U-576 and *SS Bluefields*. Image: NOAA Above: Enlarged sonar images of the *Bluefields* (top) and U-576 (bottom). Images: NOAA

Turret Conservation — The Long Journey

On August 5, 2002, nearly 140 years after the sinking of the historic Civil War ironclad, USS *Monitor*, its turret was raised 240 feet from the depths of the Atlantic Ocean off Cape Hatteras, North Carolina. The turret was placed on a barge and taken to The Mariners' Museum in Newport News, Virginia, the principle repository for *Monitor* artifacts. This three-day trip marked the beginning of a long journey of preservation and conservation that continues today, 14 years later.

The conservation of artifacts is a process that requires a lot of time and patience, and this iconic piece of history is certainly taking time, lots of time—perhaps another 10 to 15 years! However, this summer, the turret began a new chapter in the conservation journey that will move it along a little more quickly. Conservators will use new dry ice cleaning methods to speed up the process. However, even though the turret was originally constructed from heavy iron, years in its saltwater environment has taken its toll on the metal, making it a lot more fragile than it looks. Therefore, the turret had to undergo some preparation before dry ice cleaning could be used.

The preparation work needed to be completed in three phases, and this summer provided the perfect opportunity. For the conservation process, the turret is kept in a 90,000 gallon tank filled with a caustic solution, which is not safe for human access. However, from May through mid-July, the tank was drained on Mondays and refilled on Fridays allowing conservators to accomplish the three-phase process: 1) removing 21 nut guards, 2) an overall assessment of the turret, and 3) an overhaul of the entire electrochemical system.

Phase I

About a decade ago, in order to capture significant features and details, casts were made of the 21 metal nut guards that line the interior of the turret. The purpose of the nut guards was to prevent the nuts from breaking off of the bolts and flying around the turret when a bolt was hit during battle. Through former archaeological and conservation efforts, all concreted materials were removed from inside the turret, except for behind the nut guards. With over 140 years of exposure to salt water and corrosion, the already thin nut guards have become extremely fragile. Therefore, conservators carefully removed and prepared the nut guards for a separate treatment, marking the first time in over 150 years that the interior portion of the turret's bolts were exposed. Now, with the nut guards removed, conservators will use dry ice abrasion over the next several years to clean the turret's surfaces.

Phase II

An overall assessment of the turret's condition was also made, which will result in three new models of the artifact. Longstanding volunteer and scholar, Dr. Francis J. DuCoin, visited the turret and took images inside and out to create a new photomosaic. Museum staff and volunteers also took over 16,000 photos of the turret, photographing every detail. Using these images, the staff aims to create the first 3-D photogrammetric model of the turret.

Phase II also included laser scanning provided by API Services in Newport News, Virginia. In order to scan the turret, a laser scanner emits a rapidly pulsing or continuous beam, and as it rotates and sweeps over



Conservators place the remnants of two nut guards removed from inside of the turret and place them on a metal screen for further conservation. Photo: Ricles, NOAA



Remnants of a nut guard. Photo: Ricles, NOAA



API technicians setting up to laser scan the turret.
Photo: API Services



API technician watches as the laser scans the turret.
Photo: API Services



3-D model on computer screen details the inside of the turret. Photo: API Services



Laser scanner captures data points on the turret's roof.
Photo: Ricles, NOAA

an area, the scanner collects xyz coordinates for each point, creating a 3-D representation called a point cloud. API took scans of the turret's surface from different locations around and inside, collecting millions of data points.

Both the photogrammetric model and the laser scan data will be used to measure items, such as cannonball dents, allowing staff to study the diameter, depth, and volume of each dent. These measurements will help improve interpretations of the types of ordnance used, the types of guns each shot came from, and the distances and velocities of each mark on the turret walls to better understand the *Monitor's* historic time in battle.

Each of Phase II's models is extremely helpful as a starting point to track the ongoing conservation of the turret as the dry ice cleaning begins next summer. The models will be used to compare the turret's conservation in 2016 for years to come, and perhaps most importantly, they will give visitors a unique look at the turret through digital representations.

Phase III

The final phase of the preparation process involved upgrading the electrolytic reduction system. Electrolytic reduction is a process in which an artifact is placed in an electrochemical treatment bath. Metal sheets, used as sacrificial electrodes, are then suspended around the artifacts and a low-volt, low-amp current is passed through the object. During this process, salts are extracted from the artifact and its corrosion products and are drawn to the metal sheets. Oxygen and hydrogen bubbles form at the artifact's surface, helping to loosen and remove concretion from the artifact. The electrical current also consolidates and stabilizes weakened iron and reduces iron corrosion products to more stable forms. With the new system, treatment time of the turret will be accelerated.

What's Next?

Summer 2017 promises to be a busy time for conservators as they continue to clean the turret and work towards removing the turret's lower recovery pad which was used to lift the artifact in 2002. Once that is removed, conservators will attempt to remove the turret's roof, which is currently in an upside down orientation due to the ship overturning upon sinking. The team plans to have the turret's disassembly, desalination and treatment completed in ten years to prepare it for display in the museum.

New Discoveries

At the beginning of this summer, conservators were excited with anticipation hoping to find new artifacts hidden behind the nut guards. Only one was found: a bone handle knife, a common utensil used by the crew. Although the find may not seem exciting to many, Will Hoffman, Senior Conservator and Project Manager for the USS *Monitor* Center, said, "It's like being a doctor. You have to step back and look at the personal side of the situation. And finding the bone handle knife reminds us of the personal stories of the crew and makes us feel a real connection to the men who served on *Monitor*."

As the turret and other recovered artifacts continue on the journey of conservation, we look forward to the new stories revealed as conservators unlock their secrets...Stay tuned for the next exciting chapter of USS *Monitor*.



Monitor staff engaged the public at Norfolk's Harborfest 2016.
Photo: NOAA

Outreach Events

June was a busy month for Monitor NMS!

- June 10-12: Monitor NMS hosted a booth at Norfolk's Harborfest held at Town Point Park in downtown Norfolk, Va. The event, in its 40th year, is America's largest, longest-running, free maritime festival with over 200,000 in attendance each year.
- June 18: Monitor NMS hosted a booth at Pridefest at Town Point Park in downtown Norfolk, Va. The event celebrated the LGBT community and was attended by over 20,000 people.
- June 25-26: Get into Your Sanctuary weekend was held just 16 miles from the Monitor NMS at Cape Hatteras Lighthouse. Over 1000 people stopped by the tent during the event to learn more about the *Monitor* and their national marine sanctuaries.

Upcoming Outreach Events

Mark your calendars for the following dates!

- August 19: Centennial Celebration at Wright Brothers National Memorial, N.C.
- August 25: Monitor NMS will join Ft. Monroe National Monument at Harbor Park for a Norfolk Tides game in honor of the National Park Service's Centennial.
- September 10: [OBX PrideFest 2016](#) in Nags Head, N.C.
- September 17: [Day at the Docks](#) in Hatteras, N.C.
- October 1-2: [North Carolina Seafood Festival](#) in Morehead City, N.C.
- October 15: [Outer Banks Seafood Festival](#), Nags Head, N.C.
- October 22: AIA Archaeology Day in Richmond, Va.



In celebration of the LGBT community, Monitor NMS hosted a booth at Town Point Park in Norfolk, Va. Photo: NOAA

For more information contact: Shannon Ricles at shannon.ricles@noaa.gov



Over 20,000 people attended Pridefest in celebration of the LGBT community. Photo: NOAA



Monitor NMS celebrated Get into Your Sanctuary days at the Cape Hatteras Lighthouse. Photo: NOAA

Sanctuary Nomination Process

For the first time since 2000, NOAA has announced its intent to designate new sanctuaries under the National Marine Sanctuaries Act. NOAA invites communities across the nation to nominate their most treasured places in our marine and Great Lakes waters for consideration as national marine sanctuaries.

In response to ongoing widespread interest from the public, NOAA has launched a new, locally driven sanctuary [nomination process](#) developed with input from more than 18,000 public comments. Throughout the nomination process, NOAA will be available to answer questions and provide guidance to nominating communities and other interested parties. NOAA will also update nominators on the progress of the agency's review of their nomination.

Update on Mallows Bay Nomination

Mallows Bay – Potomac River is a 14 square mile area of the tidal Potomac River adjacent to Charles County, Maryland. It was nominated as a national marine sanctuary through the Sanctuary Nomination Process with broad community support.

The area encompasses historic shipwrecks of national significance that merit the additional management authority of the National Marine Sanctuaries Act. Nearly 200 known vessels span from the Revolutionary War through the present, and include the remains of the largest "Ghost Fleet" of World War I wooden steamships built for the U.S. Emergency Fleet and listed on the National Register of Historic Places.

According to Paul Orlando, NOAA's Northeast and Great Lakes Regional Coordinator, the designation of Mallows Bay-Potomac River as a National Marine Sanctuary is well-underway and continues to attract considerable public attention and support. Mr. Orlando also said that NOAA is currently working with partners from Maryland Department of Natural Resources, Maryland Historical Trust and Charles County (Md.) to develop draft versions of the designation documents. These documents incorporate recommendations provided to NOAA during an initial public comment period (Nov 2015-Jan 2016) and consider multiple options for site management, including protection of the "ghost fleet" and related maritime features, as well as enhancements to public access, recreational uses, interpretation, education and science.

Upon completion of the draft documents, NOAA will work with the state and county to complete the required clearance and consultation processes. Once satisfied,

these documents will be provided to the public for additional review and comment to help shape the final products. The timing of the public comment period has not been set.

To learn more about the sanctuary nomination process, visit <http://www.nominate.noaa.gov/>.

To learn more about Mallows Bay-Potomac River's nomination, visit <http://sanctuaries.noaa.gov/mallows-bay/>.



Benzonla resting on Caribou stern. Photo: Don Shomette



Vessels at low tide showing hull frame. Photo: Don Shomette

Inaugural Issue of *Earth is Blue* Magazine

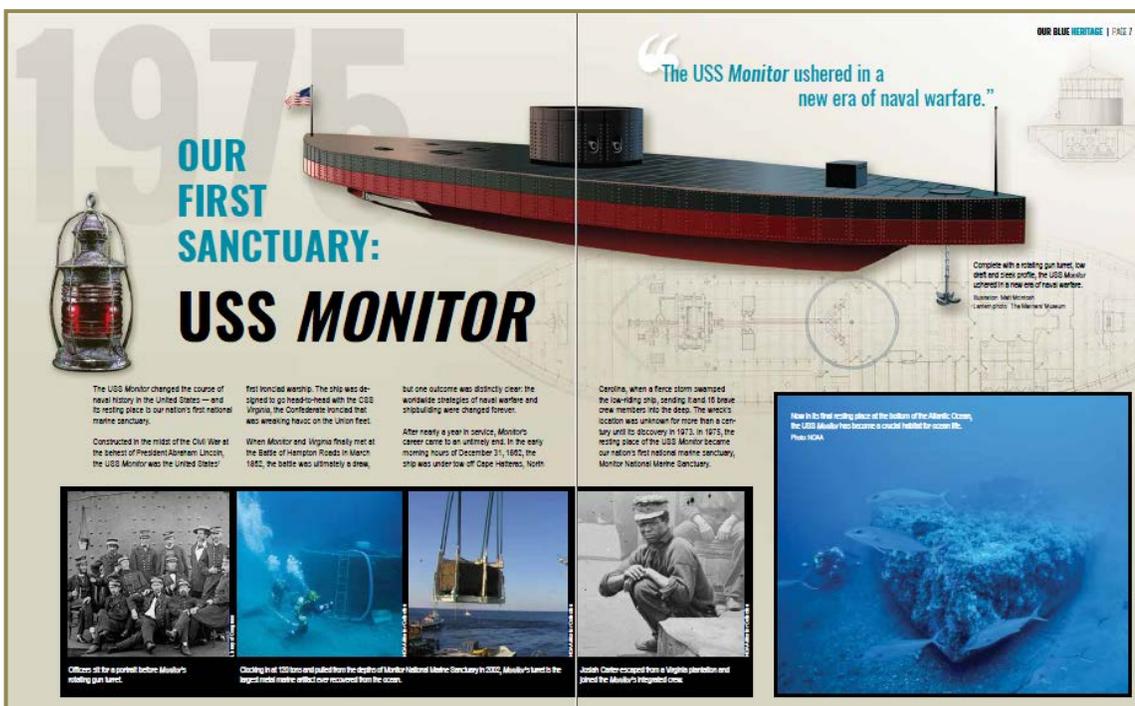
Office of National Marine Sanctuaries has launched the first issue of *Earth is Blue: The Magazine of the National Marine Sanctuaries*. The magazine highlights the wonder and beauty of our country's underwater parks.

From indigenous cultures to maritime heritage to protecting your favorite marine species, flip through the pages and learn more about the sanctuary system and all it has to offer. Discover ways you and the big blue can interact, whether it's through diving, bird watching, or reeling in your best catch! This magazine has a little bit of everything for all to enjoy, as national marine sanctuaries are for everyone, both near and far!

Get your [copy](#) today! Read the magazine online, download it as an EPUB or a PDF.

Monitor National Marine Sanctuary Highlighted

In this issue of the new *Earth is Blue* magazine (pages 6-7), read how USS *Monitor* changed the course of naval history in the United States and how its final resting place became our nation's first national marine sanctuary.



Above: Cover of the new *Earth is Blue* magazine. Photo: NOAA/ONMS

Left: Two-page spread on USS *Monitor* as our nation's first national marine sanctuary. Photo: NOAA/ONMS

Meet Your Sanctuary Staff

Will Sassorossi is an avid diver and history buff who joined the Monitor National Marine Sanctuary staff in 2015 as a maritime archaeologist. He is a recent Master's graduate of East Carolina University's Maritime Studies Program. Will's focus and thesis research involved three World War II era commercial vessels converted for military use sunk off the North Carolina coast.

Will is not new to the sanctuary program, in 2013 and 2014, he worked with the sanctuary in various capacities assisting with the Battle of the Atlantic expeditions. A native of New Hampshire, Will relocated to the Hampton Roads area and has since taken on a wide variety of roles including Sanctuary Advisory Coordinator and Volunteer Coordinator.



Top: Will Sassorossi, maritime archaeologist, works on detailing a site plan. Center: Will Sassorossi dives on the *Dixie Arrow* wreck site. Left: Will Sassorossi helps to prepare for dive operations. All photos: NOAA

National Oceanic and Atmospheric Administration
 National Ocean Service
 Office of National Marine Sanctuaries
 Monitor National Marine Sanctuary



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NATIONAL MARINE SANCTUARY SYSTEM



View a collection of fascinating photographs and an intriguing video each week from your national marine sanctuaries at <http://sanctuaries.noaa.gov/earthisblue.html>.