

# Thunder Bay National Marine Sanctuary

## Maritime Heritage Preservation Above and Below the Waves

### 2014 Resource Protection Highlights

Based on several years of research by the sanctuary and its scientific partners, as well as public input and widespread support from local and regional interests, the sanctuary expanded from 448 square miles to 4,300 square miles. The newly expanded sanctuary contains 92 known shipwreck sites and as many as 100 yet to be discovered. To date, the sanctuary has conducted sonar and/or diver-based site evaluations at 78 of the 92 known shipwrecks sites.

In 2014, the sanctuary research team operated 48 days at sea in the sanctuary, performed 285 scientific and working dives in Thunder Bay and maintained moorings at 27 shipwreck sites.

Using a new Kongsberg 2040c multibeam sonar on loan from U.S. Coast Survey, the sanctuary undertook a substrate classification survey requested and funded by U.S. Fish and Wildlife Service (USFWS). TBNMS partnered with the [USFW Alpena office](#) to acoustically map Six Fathom Bank, a productive spawning ground for lake trout 40 miles offshore. The two-year project will characterize the area's substrate and produce bathymetry maps that will help fine-tune USFWS monitoring. Other partners include the NOAA/UNH [Joint Hydrographic Center](#) and the [General Bathymetric Chart of the Oceans](#) program. The team mapped 14 square miles in 2014 obtaining bathymetry and backscatter data, and ground truthing 80 locations with HD camera drops.

Working in partnership with [2G Robotics](#), the sanctuary produced a laser scan/point cloud data of the steamer *Monohansett*. This pilot project sought to better understand laser scanning technology and the required operations. 2G Robotics equipment and services were provided in-kind.

With partners from the [Monitor NMS](#) and [East Carolina University Diving and Water Safety Program](#), the sanctuary conducted a two week technical diving project aimed at assessing and monitoring four shipwrecks. Using closed circuit rebreathers and decompression techniques the team produced 3 photomosaics and updated monitoring photos and video. Most striking were changes that occurred over a 9 year period at the steamer *Pewabic* site.



Above, the boundaries of the newly expanded 4,300 square mile Thunder Bay National Marine Sanctuary.

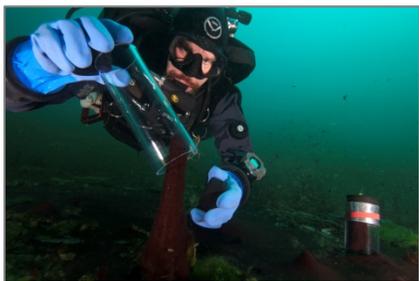


Above/Below, laser scanning the steamer *Monohansett's* stern. The unit was moved incrementally around the wreck to create a 3D point cloud model of the wreck site.



## Connecting Science and Education at Thunder Bay National Marine Sanctuary

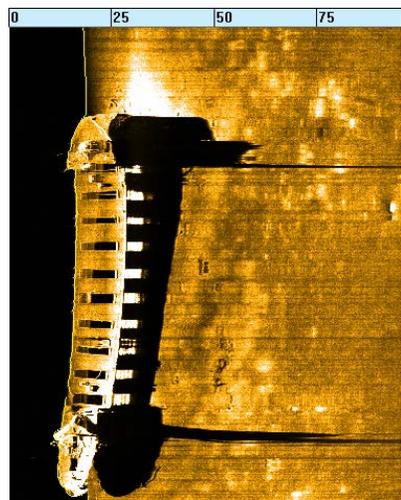
The TBNMS research team maintains a regular media presence in northeast Michigan, including a monthly TV talk show, a live weekly TV news morning appearance, and a weekly radio spot. Sanctuary research is also highlighted in a monthly regional news magazine with a circulation of over 14,000. The team contributed to two "live connect" interactions with MATE ROV students and mentors from WA and CA, and gave 36 public presentations and lectures including support of Alpena High School's innovative Shipwreck Alley curriculum. The team also contributed to 3-weeks of teaching and on-water support for Alpena Community College's Marine Technology Program. Among other media, the sanctuary research team hosted writers from *Archaeology Magazine* and *New York Times Magazine* who will profile the sanctuary in upcoming issues.



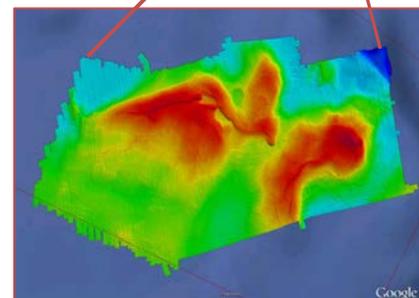
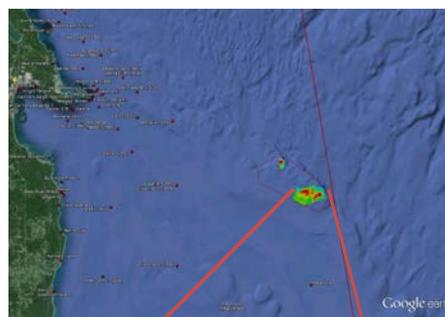
Above, a sanctuary archeologist samples microbial mats at the Middle Island sinkhole, which hosts a range of microbes of interest to researchers- from biologists to biochemists.



Above, images showing changes at the *Pewabic* site from 2005 to 2014. A dramatic increase in invasive quagga mussels is apparent, as is the removal of artifacts. These images are of the same area, from opposite perspectives.



Above, a 2014 sonar image of the steamer *W. C. Franz*, located in the expanded sanctuary. Below, multibeam coverage of Six Fathom Bank, collected by the sanctuary and U S Coast Survey for the USFW Service.



The sanctuary submitted four historic shipwrecks nominations to the National Register of Historic Places: *Pewabic*, *M. F. Merrick*, *Etruria*, and *Kyle Spangler*.

TBNMS continued its remote sensing efforts, producing new or updated sonar images of the *John Shaw*, *W. C. Franz*, *W. H. Gilbert*, *D. R. Hanna* and *Isaac Scott* using a Klein 3000 side scan. The team also utilized a Klein 3900, on loan from U.S. Coast Survey, to obtain higher resolution imagery of 30 sites. TBNMS and its research partners have now obtained good quality sonar images of 49 of the 92 known wrecks in the sanctuary.

With assistance from [U.S. Coast Survey](http://www.uscoastsurvey.gov), the sanctuary conducted reconnaissance bathymetric mapping at the port of Calcite in Rogers City. The multi-service deepwater port is being developed as [collaborative effort](#) between Carmeuse Lime and Stone, Moran Ironworks and the City of Rogers City. The survey will help the port plan for future growth, including ship building and repair.

Through diving, sample collection and vessel operations, the sanctuary research team continued to support two multidisciplinary projects: the Michigan Department of Environmental Quality and University of Vermont experimental [reef restoration project](#), and the Grand Valley State University and University of Michigan [microbial research](#) at the Middle Island sinkhole.

The sanctuary hosted the 13<sup>th</sup> Annual MATE International ROV Competition, bringing 59 teams from 13 countries, 18 states, and over 800 people to Alpena. Teams competed in the 80-diameter, 550,000 gallon training tank which is the centerpiece of the ONMS Center of Excellence for Diving and Marine Technology Education. In support of regional and international MATE competitions, 24 sanctuary and MI DNR volunteer divers contributed 125 hours of “bottom time.” Above the water, 15 volunteers contributed 649 hours of work in the sanctuary’s artifact conservation lab.

During the winter of 2014 the sanctuary will fulfill a successful grant proposal to NOAA’s [Preserve America Initiative](#), creating and exhibit for the Great Lakes Maritime Heritage Center focusing on marine technology. The centerpiece will be an ROV simulator promoting sanctuary stewardship, STEM education, and Alpena Community College’s [Marine Technology](#) program.