

Thunder Bay National Marine Sanctuary

ONMS Center of Excellence for Diving and Marine Technology Education



The Center of Excellence for Diving and Marine Technology Education at Thunder Bay NMS has three interrelated goals:

- To become a hub for specialized dive training and innovation, serving partners within NOAA, the broader science community, and state and regional public safety agencies.
- To export diving expertise and capabilities that will enhance conservation efforts throughout the national marine sanctuary system, NOAA and the broader science community.
- To become a Great Lakes hub for applied marine technology education, offering teachers and students from elementary school through higher education a stimulating environment to develop projects, train, and supplement their own curriculum.



Above, a sanctuary archeologist samples microbial mats within a submerged sinkhole. The sanctuary's scientific diving capabilities are regularly leveraged by university and government researchers from a range of disciplines.

Below, the sanctuary's 50-foot RV *Storm* supports both science and education missions. The Center of Excellence allows students and teachers to develop and train as well as operationalize their equipment in areal-world application.



Students compete during the 2014 MATE International ROV competition. The 3-day event brought 59 teams from 13 countries and over 800 people to Alpena, Michigan.



Current Training Capabilities and Assets

- NOAA Scientific Diver Instruction
- DAN Instruction including Emergency Oxygen, First Aid for Hazardous Marine Life, Neurological Assessment, CPR and First Aid, Diving Emergency Management Provider, CPR: Health Care Provider with First Aid, and Diving First Aid for Professional Divers
- OTS Guardian full face mask and hardwired/wireless communication instruction
- NOAA Specialty Task Endorsements working in cooperation with the NOAA Diving Center
- Nautical Archaeology Society (NAS) training with four instructors on staff
- 700 square foot climate controlled dive locker
- Full open circuit mixed gas diving capabilities to 250 foot depth; closed circuit rebreather capabilities to 150 foot depth.
- On site compressors, gas boosters and related equipment to support air, nitrox and mixed gas diving.
- Access to two mono-place recompression chambers at the Center for Wound Healing and Hyperbaric Medicine at the Alpena Regional Medical Center
- Ability to host up to 20 divers for operations; On site housing for 10 divers
- 50-seat classroom, 100-seat theater with video conference capabilities



Above/Below, diving and marine technology are fundamental to the sanctuary's conservation efforts. Using multiple types of remote sensing technology and modes of diving, the research team has assessed 74 of the 92 known shipwrecks in the 4,300 sq. mi. sanctuary.



What is needed to fully operationalize the Center for Excellence and make a sustained cultural, economic and conservation impact in the Great Lakes?

- **Filtration system, epoxy interior coating, and three season cover/roof for training tank**
- **Funding for one educator dedicated to program development, marketing and facility oversight**

Training Tank and Open Water Environments

- 550,000 gallon fresh water concrete tank
- Measures 80 feet wide by 14 feet deep
- 14 foot deep decking around half of the tank; wheelchair accessible
- Multiple 110v power drops at tank side; 220v available
- Controlled environment for educational programs, outreach events, ROV/AUV, SAR drills, and archaeological training.
- 25 shipwreck sites with permanent moorings at depths from 8 feet to 100 feet
- Access to Olympic size pool; easy access to beach and river dive sites

Research Vessel *Storm*

- 50 foot former Coast Guard vessel retrofit in 2009
- Capable of carrying 8 technical divers
- Twin 500 HP Detroit diesel engines
- 300 nautical mile range
- Onboard emergency oxygen system capable of lasting 8 hours and supporting two injured divers
- Drop down transom for easy diver deployment and recovery
- Through hull diver recall system
- RESON 8101 multi-beam sonar
- Klein 3000 side scan sonar
- Outland and VideoRay Remotely Operated Vehicles
- 2000 lbs crane
- Operated in partnership with the Great Lakes Environmental Research Lab (GLERL)

NOAA and Partner Diving Projects

- Divers from Thunder Bay NMS have supported maritime archaeological and biological dive projects in Monterey Bay NMS, Cordell Bank NMS, Flower Garden Banks NMS, Florida Keys NMS, Monitor NMS, Stellwagen Bank NMS, Papahānaumokuākea MNM, and the National Marine Sanctuary of American Samoa
- Government and university partners include the National Park Service, Great Lakes Environmental Research Lab, US Geological Survey, US Fish and Wildlife Service, Bureau of Safety and Environmental Enforcement, Bureau of Ocean Energy Management, Michigan Department of Natural Resources, East Carolina University, UNC-Coast Studies Institute, Woods Hole Oceanographic Institute, University of Rhode Island, University of Vermont, University of Michigan, Grand Valley State University