

## Developing a Center of Excellence for Diving and Marine Technology Education Thunder Bay National Marine Sanctuary

NOAA's Office of National Marine Sanctuaries (ONMS) is establishing "Centers of Excellence" within the National Marine Sanctuary System to engage in the application and dissemination of innovative, policy-driven research and science to support the overall sanctuary system and MPAs throughout the nation. Four Centers of Excellence are in development: Marine Mammal Acoustic and Conservation Research at Stellwagen Bank National Marine Sanctuary; Unmanned Technologies and Channel Islands National Marine Sanctuary; Diving and Marine Technology Education at Thunder Bay National Marine Sanctuary; and Climate Policy and Strategy at Gulf of the Farallones National Marine Sanctuary.



View of the *Center of Excellence* campus, including TBNMS office, its 550,000 gallon dive training tank, and nearby open waters.

Photo: NOAA

### To Greater Depths

The *Center of Excellence for Diving and Marine Technology Education* at Thunder Bay National Marine Sanctuary (TBNMS) is a controlled environment for research and technology applications, educational programs, outreach events, and drills and trainings. It 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; and

- To establish 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.

### Training Capabilities

*Center of Excellence* staff can provide a range of trainings and technical instructions, such as:

- NOAA Diver courses, including scientific and special task endorsements
- Various Divers Alert Network emergency and first aid courses
- OTS Guardian full face mask and hardwired/wireless communication
- Nautical Archaeology Society training

### Partnerships at Work

The *Center of Excellence* partners with several government, university and private entities at the local, state, national and federal levels. Divers from ONMS and partner entities who have been trained at TBNMS support maritime archaeological and biological dive projects throughout the sanctuary system. In addition, R/V *Storm* is operated in partnership with the Great Lakes Environmental Research Lab, and the Center for Wound Healing and Hyperbaric Medicine at the Alpena Regional Medical Center hosts two recompression chambers.

## Assets and Infrastructure

The *Center of Excellence* has first-class facilities, equipment and platforms on the TBNMS campus in Alpena, MI, and nearby access to other areas and equipment to support expert diving operations.

- **Training Tank:** 550,000 gallon (80 ft wide x 14 ft deep); freshwater; concrete; decking around half; wheelchair accessible; multiple power drops at side.
- **Open Water:** Moorings at 25 shipwreck sites (8 ft to 100 ft); access to beach and river dive sites; excellent confined water training areas.
- **Research Vessel *Storm*:** 50 ft; twin 500 hp diesel engines; capacity for 8 divers; 300 nm range; onboard emergency oxygen system; 2000 lbs crane; multi-beam and side scan sonars; two remotely operated vehicles; dropdown transom and through hull diver recall system.
- **Equipment:** 700 sq ft, climate-controlled dive locker; compressors, gas boosters and related equipment for air, nitrox and mixed-gas diving; access to two mono-place recompression chambers; access to indoor pool.
- **Other Capabilities:** Full open-circuit and closed-circuit rebreather mixed-gas diving capabilities to 250 ft.
- **Meeting and Housing Facilities:** Space to host 20 divers for training; housing for 10 people; 50-seat classroom; 100-seat theater with video conferencing.

## Future Funding and Development

Though the *Center of Excellence* operations are highly developed, additional funding, infrastructure and personnel would enhance efforts to fulfill its goals and help make sustained cultural, economic and conservation impacts in the Great Lakes, around the sanctuary system and beyond. Continued funding and partnership endeavors would ensure the *Center of Excellence* remains relevant and modern. The National Marine Sanctuary Foundation will serve as the fiscal sponsor of extramural funds (i.e., grants, donations) awarded for such projects and activities.

## NATIONAL MARINE SANCTUARY SYSTEM

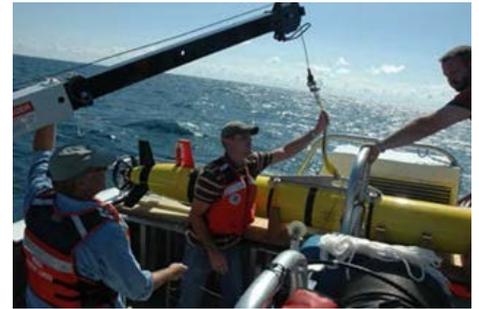
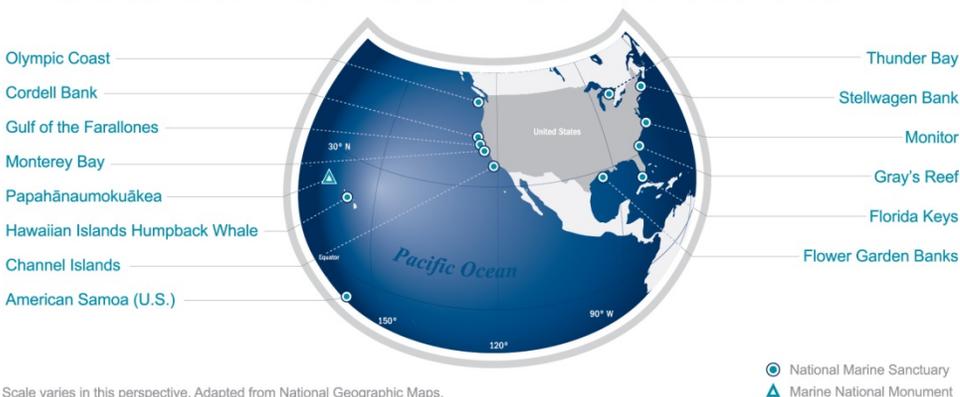


Photo: NOAA

Multiple types of marine technology are fundamental for conservation efforts in TBNMS and other sanctuaries. Here, a remotely operated vehicle is being deployed from R/V *Storm*.



Photo: NOAA

Scientific diving capabilities at TBNMS are regularly leveraged by university and government researchers from a range of disciplines. Here, a sanctuary archeologist samples microbial mats within a submerged sinkhole.



Photo: NOAA

In 2014, the sanctuary and *Center of Excellence* hosted the MATE International ROV competition, which brought 59 teams from 13 countries and more than 800 people to Alpena, Michigan.



Photo: NOAA

Various modes of diving are applied in the sanctuary to assess the shipwrecks in its 4,300 sq. mi. area. Here, sanctuary archaeologists document a shipwreck in 185 feet of water using mixed gas diving techniques.