



Woods Hole Oceanographic Institution
Marine Mammal Center: Progress and Prospects
June 2013

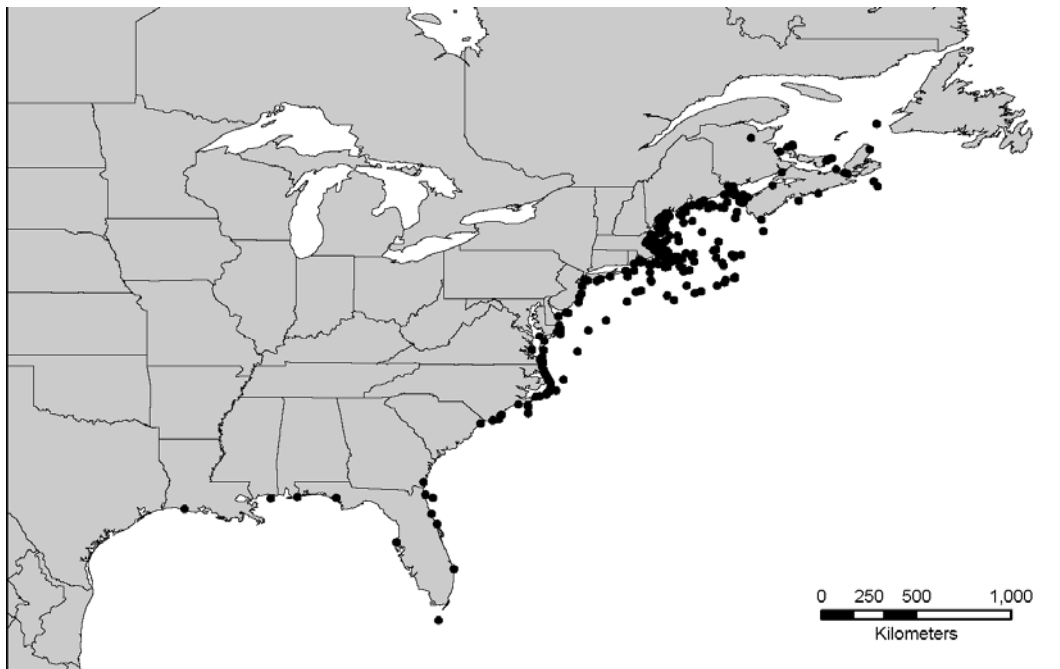
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Attaching a tag to a sperm whale in New Zealand - Image: WHOI Advanced Imaging and Visualization Laboratory

The Marine Mammal Center (MMC) was founded in May 2008 with a generous donation from Peter and Ginny Nicholas. The goal of the MMC is to develop strength in basic marine mammal research and technology, concentrating on conservation applications through strategic partnerships and interdisciplinary research approaches.

The MMC has continued to pursue these goals from its founding to present by funding research projects that focus on issues affecting conservation of marine mammals and other marine animals. Our education component is also strong through the sponsorship of postdoctoral investigators' research and the exchange of graduate students between WHOI and the Duke Nicholas School of the Environment, and other universities, through summer internship programs. We also sponsor lectures and conduct workshops on critical aspects of marine mammal science, developing conservation and diagnostic infrastructure, as well as outreach and research coordination through collaborative exchange with other research institutions around the world. Through such partnerships and with our diagnostic facilities at WHOI, we integrate diverse approaches and methods to understanding marine mammals and the ways humans influence their health, populations and ecosystems.



Fishing gear entanglement mortalities of large whales between 1970 and 2010 (van der Hoop et al 2012, *Conservation Biology*)

Projects funded in 2012 are ongoing and are focusing on crucial research including monitoring newly endangered mammal species (melon-headed whales and false killer whales) using passive acoustics to mitigate human impacts; estimating drag forces and energy expenditure of North Atlantic Right Whales entangled in fishing gear; monitoring and documenting seasonal occurrences of bowhead whales in the Bering Sea to investigate how global warming may impact the adaptability of this species; a study focused on humpback whales and their prey in Massachusetts Bay to further understand



how they interact; a pilot study investigating a reliable blood indicator of the levels of stress seals and other marine mammals are under due to human activities; the development of a combined system of tools, (including Digital Acoustic Recording Tag or DTAG, GPS receiver, an attitude sensor and a stereo camera) to study how an individual marine mammal's behavior is heavily influenced by the activities and interactions with group members. If successful, this would be an extremely useful tool with broad applications ranging from demography and health assessments to population estimates. Three more projects will be funded in July 2013: a study of whale calls found in seismic survey data; completion of a study of the co-occurrence of right whales and lobster gear in the Gulf of Maine (the whales become entangled in the gear); and detection of baleen whales using a wave glider.

The MMC also helps to maintain specialized facilities at WHOI that provide our researchers and collaborators with the tools and platforms they need to conduct rigorous research. These include:

❖ **CT Scanning Facility**

The Computerized Scanning and Imaging Facility (CSI) is an invaluable tool for understanding the internal structure of marine animals.

❖ **Necropsy Facility**

A necropsy is a dissection of the dead body of an animal to determine the cause of death. The necropsy room can accommodate several small animal necropsies at once or necropsies of larger single animals up to 5 meters in length.

❖ **Freezers & Chillers**

The -20° C freezer and +4° C chiller have built-in overhead rail and lift systems for transport of animals and specimens to and from outside receiving areas into the necropsy or scanning room.

❖ **Specimen Storage**

The storage room is a vented, temperature controlled room used primarily to store samples that are preserved in formalin or other volatile chemical preservatives.

The MMC and the Nicholas School of the Environment of Duke University co-sponsor a fellowship program for graduate students studying marine mammal science at either institution. The fellowship supports transportation and living expenses with the goal that fellows can work at the partner institution with no additional costs compared to working at their own institution. The student is expected, as part of the application process, to develop a proposal for a project that is approved by both his/her advisor and a faculty member at the other institution interested in sponsoring the fellow. Also, as part of the application process, students must work with their academic advisor to contact a faculty member from the other institution to be their sponsoring advisor. In 2012, the MMC sponsored four of these fellowships, and this year, three graduate students are participating in the program.



The MMC is also currently sponsoring a graduate student summer internship with the Northwest Atlantic Seal Research Consortium (NASRC). The intern, Amber Creamer, is a Masters of Marine Management (MMM) candidate at Dalhousie University's Marine Affairs Program in Nova Scotia, Canada. Her seven-week internship is primarily taking place at the Center for Coastal Studies in Provincetown, MA, among the Cape Cod fishing community, followed by a visit to the MMC at WHOI, where she will have the opportunity to interact with other NASRC partners and collaborators.



Grey seals are hauling out in increasing numbers on sandbars on Outer Cape Cod

Earlier this year, the MMC and the Office of Applied Oceanography co-hosted a visit and special seminar by Dom Tollit from the University of St Andrews, Scotland, and Douglas Mundie of SMRU Ltd, a marine mammal consultancy which is a commercial spin out from the world renowned Sea Mammal Research Unit at St. Andrews University. They came to WHOI to promote the use of a cutting-edge autonomous passive acoustic monitoring system for marine mammals called PAMBuoy™. It operates continuously to automatically detect and classify vocalizing marine mammals – whales, dolphins and porpoises – and provides high resolution data that can be used to identify which species are present and determine temporal patterns in use. The title of their presentation was “Marine mammals in a renewable age: Developing tools for real-time detection of marine mammals”.

Last month, Walter Zimmer from The Centre for Maritime Research and Experimentation (CMRE), an executive body of NATO's Science and Technology Organization (STO), presented an MMC sponsored presentation at WHOI titled “Using DTAGs and Physics to Assess Physiological Limits of Deep Divers.” Digital acoustic recording tags (DTAGs) were developed by WHOI scientists and engineers specifically to monitor the behavior of marine mammals, and their response to sound, continuously throughout the dive cycle. The sensors sample the orientation of the animal in three dimensions with sufficient speed and resolution to capture individual fluke strokes. Audio and sensor recording is synchronous so the relative timing of sounds and motion can be determined precisely.

In May of 2013, the MMC co-sponsored an International Whaling Commission (IWC) workshop “Assessing the Impacts of Marine Debris.” Held at WHOI, this workshop brought together experts from around the world to better understand marine debris and its effect on cetaceans. Man-made ocean debris includes plastics, abandoned and lost



fishing gear, glass, metal and wood. Ingestion and entanglement can cause horrific suffering to marine mammals. This workshop began with a one-day public seminar which was open to anyone with an interest in the issue. The MMC and the IWC are committed to understanding the nature and impact of marine debris on whales and other marine mammals and mitigating those impacts.

Looking forward, the MMC will continue to bring together the scientific expertise, resources and technology innovation to address the effects of human activities on marine mammals and the ecosystems on which they depend, and to aid in the development of future generations of marine mammal scientists and researchers. We are grateful for the support we have received for the Center. Funds remain to maintain this level of activity through 2014. However, further support will be needed beyond next year for the Center to continue at its current level.

For further information about the Marine Mammal Center, please contact Dr. Michael J. Moore at 508.289.3228 or mmoore@whoi.edu .

