

## **Improving visual survey capabilities for marine mammal studies**

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### **LONG-TERM GOALS**

The Navy sponsors research to improve efforts to mitigate interactions between fleet activities and marine mammals. Fundamental information on the occurrence, abundance, and status of marine mammals is typically derived from visual surveys, and data from such surveys are most often used to estimate population abundance, develop predictive relationships between marine mammal distribution and oceanographic conditions, or as “ground truth” for other marine mammal detection methods. Surveys require human observers to systematically scan the ocean surface for the presence of air-breathing mammals, and they can be conducted from ships, aircraft, or land. For ship- and land-based surveys, powerful, pedestal-mounted, 25×150 “big-eye” binoculars are required to accurately identify marine mammals at distances of up to several kilometers from the observing platform. Fujinon 25×150 MTM binoculars are the standard for government and academic marine mammal research, and the long-term goal of this project is to acquire 4 of these binoculars to support funded Department of Defense (DoD) projects.

### **OBJECTIVES**

The sole objective of this project was to purchase 4 Fujinon 25×150 MTM binoculars.

### **APPROACH**

The purchase of big-eye binoculars will substantially improve the efficacy of funded Navy/DoD projects. The ONR Marine Mammals and Biology (MMB) program has funded a project to conduct marine mammal visual surveys in the Bay of Bengal as part of the ONR-and NRL-funded Air-Sea Interactions in the Northern Indian Ocean Regional Initiative (ASIRI) program, a physical oceanographic research effort to study upper ocean processes and air-sea interactions that regulate the Asian monsoons. We will use the DURIP-funded big-eye binoculars to characterize the occurrence, distribution, and habitat associations of cetaceans in the oceanic waters of the Bay of Bengal during 2013-2015. We also hope to expand our project by (1) collaborating with Indian scientists conducting complementary physical oceanographic studies in the Bay of Bengal, (2) equipping an Indian oceanographic vessel with loaned DURIP-funded big-eye binoculars, (3) training Indian scientists in

marine mammal detection and identification, and (4) collaborating with our Indian colleagues through scientist, student and postdoc exchanges to analyze and publish survey results.

I will also use the DURIP-funded big-eye binoculars in a project current funded by the DoD Environmental Security Technology Certification Program (ESTCP) and Navy Living Marine Resources (LMR) Program. This project will demonstrate and evaluate real-time passive acoustic detection, classification, and reporting from autonomous platforms, a capability that has been developed with support from the ONR MMB program. The DURIP-funded big-eye binoculars will be used to collect critical ground-truth visual observations from ship- and land-based platforms in proximity to autonomous platforms that can detect and report the occurrence of several species of baleen whales. This technology will ultimately be used to help the Navy mitigate interactions with marine mammals.

## **WORK COMPLETED**

Four Fujinon binoculars with installed reticles were received from Baker Marine Instruments in December 2014. Four pedestals for the binoculars were also received from the Scripps Institution of Oceanography machine shop in December 2014. Four custom wooden disks were fabricated by the WHOI carpenter shop to provide a shelf for observers to rest their arms.

Two sets of binoculars, pedestals, and wooden disks were shipped to Mount Desert Rock Island off the Maine coast for installation on the upper floor of the lighthouse there during July 2015 (Figure 1). The binoculars are being used to survey for large whales (Figures 2 and 3) in the vicinity of a passive acoustic array of bottom mounted hydrophones and a DMON-equipped moored buoy system that relays acoustic detections of right, fin, sei, and humpback whales in near real time to a shore-side computer system (see data at [dcs.whoi.edu](https://dcs.whoi.edu)). These observations are an essential part of the project to demonstrate and evaluate the ONR-funded DMON passive acoustic technology; this project is funded by the ESTCP and LMR.

The remaining funds are being used to fabricate custom shipping boxes for the binoculars and yokes to facilitate shipping.

## **RESULTS**

No results to report.

## **IMPACT/APPLICATIONS**

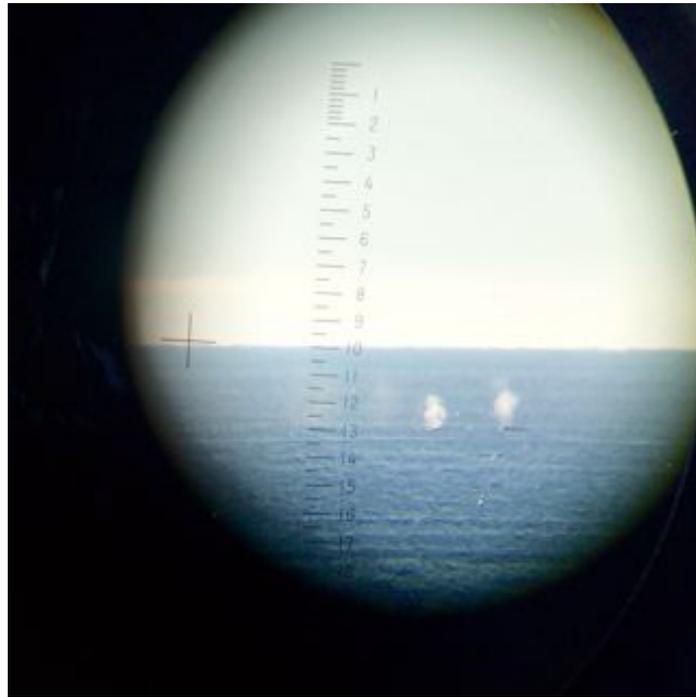
The purchase of the binoculars will facilitate Navy and DoD research.



*Figure 1. Mount Desert Rock house and lighthouse. Two big-eye binoculars were mounted at the top of the lighthouse during July 2015.*



*Figure 2. Fujinon 25×150 MTM “big-eye” binoculars being used on Mount Desert Rock.*



*Figure 3. Two fin whale blows viewed through the big-eye binoculars. Note installed reticles for estimating distance to the whales.*