



Demonstration of an acoustic warning system to alert manatees of approaching DOD vessels

Project # 06-232

Background:

The West Indian manatee (*Trichechus manatus*) is an endangered marine mammal that inhabits the waterways of DoD installations in S.E. Georgia and peninsular Florida. Manatees are vulnerable to collisions with watercraft. Wildlife regulatory agencies have proposed slow speed zones in an effort to protect manatees by. This decision could affect DoD support vessel traffic and base operations. Our behavioral hearing and acoustic propagation studies revealed manatees cannot adequately detect and locate the dominant lower frequency sounds of approaching vessels, and slower speeds can increase the risks of collisions. These discoveries lead to the recommendation for an acoustic warning device to provide manatees with the sensory awareness to avoid collisions.



Objective:

This study will test the efficacy of two acoustic prototype devices designed to alert manatees of approaching vessels.

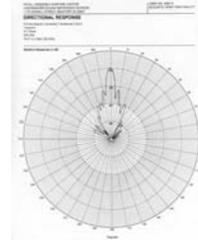
Summary of Approach:

We systematically recorded and archived the manatee's behavior in response to approaching vessels. Continuous behavioral observations were recorded from the air using a tethered aerostat video system in concert with a network of underwater acoustic sensors to synchronously record behavior and the localized acoustic levels throughout the demonstration area. Two experimental conditions were followed: 1) vessel approaches without the alarm and 2) the same vessel approaches with the alarm will be analyzed to determine the frequency, strength, and timing of manatee avoidance responses to the two conditions.

Benefit:

The device is an effective and inexpensive method to protect manatee from injury with vessels at DoD installations without effecting the speed or operation of DoD and support vessels. The device allows these vessels to operate unimpeded in manatee-inhabited areas at optimum speeds at all times. Aside from the direct military benefit, the device could provide wide spread benefits in the civilian sector and used to protect manatees throughout their range.

The previous manatee hearing research that led to this applied project received wide spread positive media attention. The final application and demonstration of this conservation technology should receive further positive media attention. This positive high profile project will further the awareness of the DoD Legacy Resource Management Program and the Navy's commitment to protecting this endangered marine mammal.



Accomplishments:

Because of this project, we have developed two parametric transducers to project a stable narrow beam of sound just under the surface of the water for distances of up to 100 m. The devices require very little power to operate, designed to exploit the manatees best hearing abilities. Fish and Wildlife granted permits to test the efficacy of the devices in open water with wild manatees at the Kings Bay Submarine Base and in other manatee habitats. Synchronized aerial video and underwater acoustic monitoring systems have been developed and tested to provide time-coded records of manatee behavior and acoustic conditions during these tests. The manatees' responses to sound waves produced by the transducer demonstrate the devices' efficiency in alerting manatees of oncoming vessels.

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