Print

T. Aran Mooney: Soundscapes and Passive Acoustics

Cape Wind

Project summary

This work includes monitoring the marine soundscape on and near Horseshoe Shoals, Nantucket Sound, the proposed Cape Wind windfarm site. The goal is to establish baseline passive acoustic monitoring of this ecosystem and identify the occurence of different types sounds (and hence, biological activity and physical events). We're looking for a motivated graduate student to assist with this project.

This early work is novel and critical to establish the baseline soundscape of the Nantucket Sound environment. Deoployments began in April (2012) using WHOI's innovative acoustic recording device called the DMON (Digital acoustic Monitors). This records broadband (up to 60 kHz). As part of this project, we are going out to Nantucket Sound on a weekly basis to change out DMONs and download the data. We also developed a simple mooring to deploy the DMON.

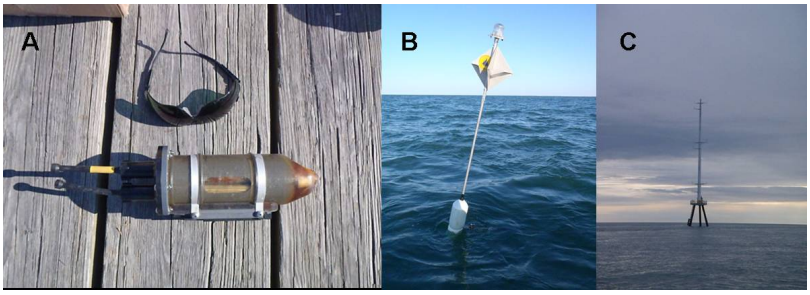

Figure 1. (A)The DMON on the dock after retrieval. This small device records sounds from low-frequency fish and construction sounds to ultrasonic dolphin signals. (B) Our mooring on Horseshoe Shoals, Nantucket Sound, site of the future Cape Wind windfarm. (C) The current CapeWind 'test' platform on Horseshoe Shoals. Our DMON is approximately 200 m from this platform.

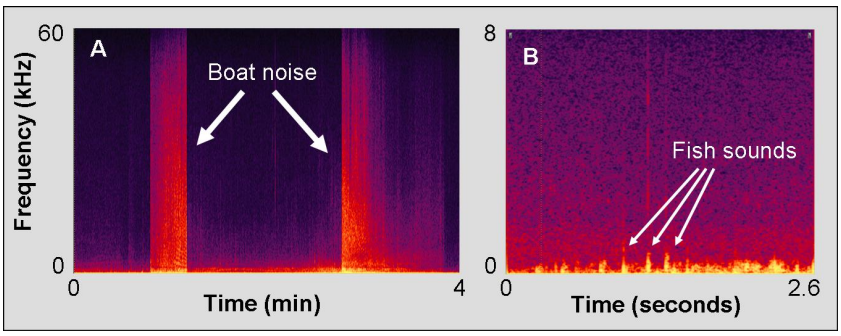

Figure 2. Sound recordings from the first DMON deployment on Horseshoe Shoals, Nantucket Sound. (A) Shows noise from nearby fishing vessels, but otherwise a relatively quiet environment. (B) Yet unidentified fish sounds.

This project was catalyzed by support from the Harrison Foundation, the John E. and Anne W. Sawyer Endowed Fund and continues with support from NOAA's Sea Grant.

Fish behavior

Project summary

Prior work has included developing an hand-held, diver-operated passive acoustic system to record fish sounds and associated swimming behaviors.

Mooney, TA, Lammers, MO, Santos, PA, and Nachtigall, PE. An underwater system to monitor ecologically important fish sounds: Characterization and diel trends of three species of Pomacentrids. 149th Meeting of the Acoustical Society of America. Vancouver, B.C., Canada. May 16-20, 2005.

The EAR

Enlarge image

Project summary

I contributed to the development of the EAR (Ecological Acoustic Recorder), a passive acoustic monitoring device used in reef and deep sea environments.

An Ecological Acoustic Recorder (EAR) for long-term monitoring of biological and anthropogenic sounds on coral reefs and other marine habitats

Keeping track of long-term biological trends in many marine habitats is a challenging task that is exacerbated when the habitats in question are in remote locations. Monitoring the ambient sound field may be a useful way of gauging biological activity because many behavioral processes are often accompanied by sound production. This article reports the preliminary results of an effort to develop and use an Ecological Acoustic Recorder (EAR) to monitor biological activity on coral reefs and in surrounding waters for periods of up to one year. The EAR is a microprocessor-based autonomous recorder designed to periodically sample the ambient sound field and also automatically detect sounds that meet specific criteria. The system was used to record the sound field of coral reefs and other marine habitats on Oahu, Hawaii. Snapping shrimp produced the dominant acoustic energy on the reefs examined and exhibited clear diel acoustic trends. Other biological sounds recorded included those produced by fish and cetaceans, which also exhibited distinct temporal variability. Motor vessel activity could also be monitored effectively with the EAR. The results indicate that acoustic monitoring may be an effective means of tracking biological and anthropogenic activity at locations where traditional surveys are impractical.

Lammers, MO, Brainard, RE, Au, WWL, Mooney, TA, Wong, K. 2008. An ecological acoustic recorder (EAR) for long-term monitoring of biological and anthropogenic sounds on coral reefs and other marine habitats. 123(3): 1720-1228. Journal of the Acoustical Society of America.

Last updated: September 30, 2013

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