

Cape Cod Bay Right Whale Localization Study

What were the primary questions you were trying to address with this research?

To collect all marine mammal vocalizations in Cape Cod Bay during the time of year when many different species are present there to test a new approach for identifying, localizing, and tracking specifically endangered right whales.

What have you discovered or learned that you didn't know before you started this work?

That Cape Cod Bay is a noisy place in April. It is full of multiple species that possibly may be 'talking' to other each other or even species. Each mammal species seem to have their own frequency band for communication similar to different radio stations. Also, we recorded some vocalizations that have not been identified to a certain species and have had discussions with NOAA marine mammal researchers who have heard similar vocalizations in Georges Bank.

What is the significance of your findings for others working in this field of inquiry and for the broader scientific community?

We have a continuous 25 day recordings of marine mammals in Cape Cod Bay in three different places. This included 3 moored vertical, multiple hydrophone arrays and one moored horizontal, multiple hydrophone array that sits on the bottom. We can listen over the entire water column with the vertical arrays and get direction with the horizontal array. These data sets could be useful to any right whale researcher and/or any researcher working in the Cape Cod Bay area.

What is the significance of this research for society?

Most marine mammal listening stations currently in use just identify the presence of a vocalizing marine mammal. This method gets more information for tracking in position and depth and could help right whales and ships avoid collisions by know exactly where the mammal is. Of course, though, the mammals have to be making noise, which they don't all the time.

What were the most unusual or unexpected results and opportunities in this investigation?

Finding a signal (vocalization) that hasn't been identified, at least it is unknown to us. Speculation is that is a fish signal.

What were the greatest challenges and difficulties?

We wanted to use our floating sensors that we deployed around right whale pods we saw to verify our method's accuracy. But we found that the right whales we saw on the surface were not the ones vocalizing.

When and where was this investigation conducted? (For instance, did you conduct new field research, or was this a new analysis of existing data?)

The extremely endangered right whale visits Cape Cod Bay to feed every Spring. Knowing they would be there, we knew we could gather the necessary data.

What were the key tools or instruments you used to conduct this research?

We deployed moorings with sensitive listening devices and temperature sensors to cover the water column and to also detect sound direction. Devices that are normally used for our acoustic propagation studies. These devices would be used to identify and position, in depth as well as range and direction, mammals who vocalize at lower frequencies.

What are your next steps?

We would like to deploy our assets again in Cape Cod Bay to monitor whale vocalizations over an extended period of time, like years. This would allow us to investigate right whale vocalizations there and if changing conditions have any effect on their positions, numbers and behavior.