

Manatees can probably hear which directions boats approach from

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The world is a perilous place for the endangered manatee. While the mammals are at risk from natural threats, human activity also poses a great danger to manatee numbers. Debborah Colbert, from the Association of Zoos and Aquariums, explains that many manatees die and are seriously injured in collisions with boats every year. However, little is known about how manatees perceive their environment.

Whether they can localize sounds, and specifically whether they can tell which direction a boat is approaching from, are crucial factors in the development of manatee protection programmes. Colbert and her colleagues from the Universities of Florida and South Florida and the New College of Florida decided to test whether the mammals can pinpoint [sound](#) sources. They publish their results in the *Journal of Experimental Biology*.

Working at the Mote Marine Laboratory and Aquarium in Florida, Colbert was able to work with two male [manatees](#), Hugh and Buffett, when she initiated a research programme to find out more about these enigmatic creatures. Both young males had been trained previously to participate in a series of sensory studies, so Colbert, Joseph Gaspard 3rd, Gordon Bauer and Roger Reep trained the animals to swim to a specific stationing platform in their enclosure where they could listen to sounds played from one of four speakers arranged around their heads.

Knowing that the manatees' hearing was most sensitive to sounds ranging from 10 to 20kHz, while the animals' calls range from 2.5 to 6kHz,

Colbert and David Mann designed three sounds ranging from 0.2 to 20kHz, 6 to 20kHz and 0.2 to 2kHz to play to the animals. The team also selected two single frequency (tonal) sounds at 4kHz and 16kHz to test how the manatees responded to less complex sounds. Having trained the manatees to swim to the speaker that they thought the sound came from, the team then played the broadband sounds, of 0.2, 0.5, 1 to 3s, from each speaker at random while monitoring the animals' responses.

One of the manatees, Buffett, successfully identified the source of the broadband sounds with almost 90% accuracy, while Hugh did slightly less well. The team was also surprised that the manatees were able to locate the sources of both the 4kHz and 16kHz tones, although the team only tested the animals with the longest of the two tonal notes, as the animals had shown signs of frustration when they heard these sounds.

So how are the animals able to localize sounds? Colbert explains that many terrestrial animals use the time difference between a sound arriving at their two ears to find the source. However, this time difference is probably extremely short in aquatic animals, as sounds travel 5 times faster in water than in air. Animals also use the intensity difference as the sound arrives at each ear, which is more pronounced in high-pitched noises, to pinpoint the source. Colbert suspects that the manatees use combinations of these and other cues to help them localize sounds, as they were able to locate the sources of high- and low-pitched sounds equally well.

Crucially, the animals can probably hear approaching speed boats and tell which direction they are coming from, which is an essential piece of information for conservation organisations as they battle to save this gentle giant.

Source: The Company of Biologists ([news](#) : [web](#))

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