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Ambient noise doesn't stop at 20 kHz

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ABSTRACT

Noise pollution might be defined as excessive, displeasing human, animal or machine-created environmental noise that disrupts the activity or balance of human or animal life. Most research and legislation in this area is aimed at the impact of noise on human beings, although there are marine regulations aimed at protecting marine mammals from excessive anthropogenic noise. Because of this, airborne noise is generally only considered in the frequency range up to 20 kHz and it may be noted that the A-weighting is not defined above this frequency. A wider frequency range has been investigated in the ocean, but the bulk of underwater ambient noise measurements concentrate on lower frequencies.

Nevertheless, there are many potential sources of higher frequency noise both in the air and under the sea, and there are many animals that are known to possess hearing ranges well into ultrasonic frequencies. The most prolific users of echolocation, bats and dolphins, employ signals extending up to 150 kHz or beyond, while their prey, some moths for example, are able to hear these signals and take evasive action. Additionally, there are many small mammals, such as rats and mice, which communicate using frequencies up to about 50 kHz.

Clearly, animals that use high frequency sound are potentially subject to interference from high frequency noise. However, as little is known about environmental noise at higher frequencies, it is difficult to estimate its effect on these animals, and it is made even more difficult by the rarity of any reliable audiometry for most animals. This paper reviews the little information that is available, assesses the likely impact of both airborne and underwater high frequency noise on creatures with high frequency hearing ranges, and concludes with a discussion of what, if anything, should be done about it.