

## Hearing and masking at low frequencies in seals

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Auditory masking occurs when an animal's ability to hear sounds of interest is reduced by the presence of overlapping noise in the environment. Masking is an environmental issue of concern for marine mammals due to their reliance on acoustic information for orientation, conspecific communication, foraging, and predator avoidance. To understand and predict masking in the presence of natural and anthropogenic noise, data are needed to describe the auditory capabilities of potential listeners. However, there are few biological data available at very low frequencies, which prohibit meaningful estimation of the effects of noise on hearing in marine mammals. In this study, behavioral methods were used to examine low-frequency hearing in two trained bearded seals (*Erignathus barbatus*). We evaluated hearing sensitivity in quiet conditions, hearing in the presence of background noise, and auditory filter characteristics. The measured auditory parameters provide the first comprehensive hearing measurements available for any pinniped below 100 Hz, and enable evaluation of low-frequency masking by complex and naturally occurring sounds in the marine environment. Results thus far demonstrate that seals can detect sound frequencies at least as low as 40 Hz, with lowest critical ratios in the region of 200 Hz. This study improves understanding of masking in seals—which have the best demonstrated low-frequency hearing abilities among marine mammals and provides insight into masking in other presumed low-frequency specialists including whales. Ultimately, these data support quantitative considerations of masking caused by specific low-frequency noise sources in realistic environments. [Supported by OGP JIP on Sound and Marine Life].

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