

ESOMM/JIP-2018

6th International Meeting on the Effects of Sound in the Ocean on Marine Mammals (ESOMM)

&

the 3rd Programme Review Meeting (PRM) of the IOGP E&P Sound & Marine Life Joint Industry Programme (JIP)

Auditory detection, masking, and temporary threshold shift in bearded seals (*Erignathus barbatus*). Invited talk. 6th International Meeting on the Effects of Sound in the Ocean on Marine Mammals and 3rd Programme Review Meeting of the E&P Sound & Marine Life Joint Industry Programme, The Hague, The Netherlands, September 2018

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Bearded seals have a circumpolar Arctic distribution and are closely associated with pack ice, spending nearly all of their lives in remote habitats; as a result, their biology and behavior remain largely unknown. With respect to sensory biology, bearded seals—like other marine mammals—rely on acoustic cues to support a range of behaviors including orientation, communication, and predator and prey detection. However, the ability of bearded seals to perceive sound has never been investigated. In this study, species-typical auditory profiles were obtained from two young bearded seals trained to cooperate in a go/no-go behavioral paradigm. Detection thresholds were measured for underwater tonal sounds from 0.10 - 61 kHz, in quiet conditions and in the presence of octave-band masking noise. The seals displayed sensitive underwater hearing, with peak sensitivity of 50 dB re 1 μ Pa and a broad range of best hearing from 0.35 - 45 kHz. Like other phocinae seals, they performed particularly well compared to other mammals when detecting target signals within background noise. Finally, one bearded seal completed additional testing to evaluate hearing before and immediately following voluntary exposure to impulsive noise from a seismic air gun. These psychoacoustic studies thoroughly describe the hearing capabilities of bearded seals. Combined with recently reported data for spotted and ringed seals, they inform regulatory guidelines regarding impulse noise exposures and best management practices for marine mammals in a rapidly changing Arctic environment. [Ongoing project, supported by the IOGP's Joint Industry Programme on Sound and Marine Life.]