Rm 200D
Acoustics and Communication

117: Loud and clear: Hearing abilities and variability within a population of wild beluga whales (Delphinapterus leucas)

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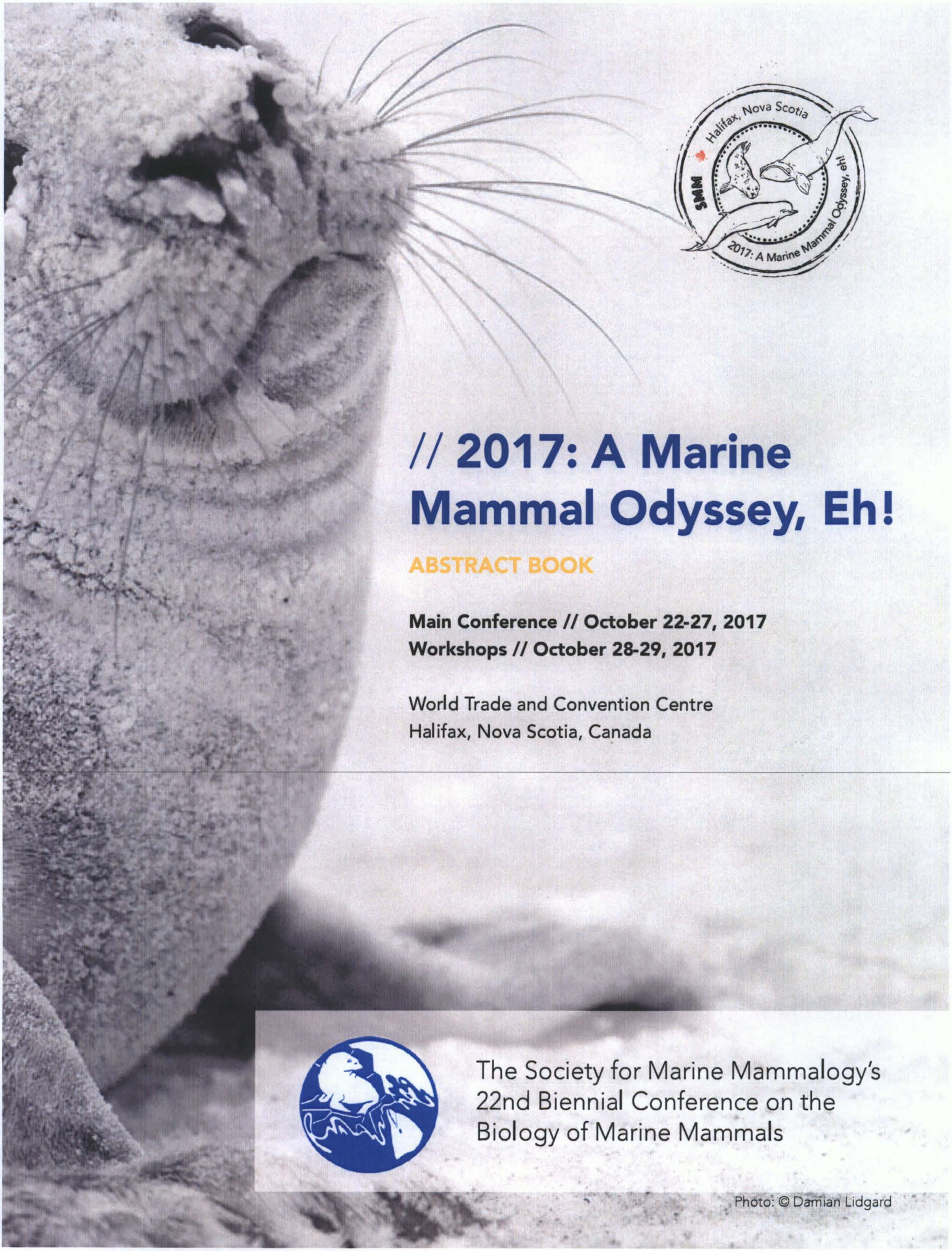
Odontocetes use hearing for vital activities including foraging, communication and navigation, and it is considered their primary sensory modality. Yet, we know little regarding the hearing of most species limiting our understanding of a species' acoustic ecology and our ability to predict impacts of increasing noise. Currently, data are typically from single individuals and captive settings; hearing within species and populations in the wild is essentially unknown. We measured the hearing abilities of 26 wild beluga whales from the Bristol Bay, Alaska, population, captured-and-released between 2011-2016. Goals included determining the hearing abilities and variability for this beluga population, providing the methods and a basis for estimating sound-sensitivity in other odontocete populations. Hearing was measured non-invasively using auditory evoked potentials from 4-150 kHz. Most belugas had low thresholds (<80 dB) from 16-100 kHz and many (76%) heard up to at least 120 kHz demonstrating broad sensitivity. While no sex-based differences were evident, hearing thresholds increased slightly with age and moderate or moderately-severe hearing loss was noted in 35% of animals. Thresholds at lower frequencies (4-11 kHz) appeared consistent with low environmental noise levels measured (70 dB/Hz), suggesting that quiet habitats may be correlated with good hearing sensitivity. We found substantial (30-70 dB) variation among individuals; this threshold variability increased at higher frequencies and regions of greater sensitivity. Composite audiograms of highest and lowest thresholds clearly demonstrate sensitivity differences. These results more than double the belugas audiogram assessments and provide novel data for wild odontocetes. Although threshold variability was considerable, it was less than measured among bottlenose dolphins suggesting differences between species or populations, and illustrating the need for comparative data. The results show a population with generally sensitive hearing; the variability among animals reflects that multiple measures best describe the maximum sensitivity and population variance for these and other odontocetes.



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ABSTRACT BOOK

Main Conference // October 22-27, 2017
Workshops // October 28-29, 2017

World Trade and Convention Centre
Halifax, Nova Scotia, Canada

The Society for Marine Mammalogy's 22nd Biennial Conference on the Biology of Marine Mammals

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