# Hearing and habitat

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The oceans cover three quarters of our world, are a major resource, and are home to a still unknown range of species. Noise impacts have the potential to affect survival of marine species that are more profound and immediate than climate change. Controlled experiments are arguably the best approach, but species are limited. While individual impacts can be important "biologically significant" impacts are our greatest concern; i.e., those in which a sufficient number of individuals sustain a temporary or permanent alteration in physiology or behaviour that results in a noticeable alteration in fitness.

Understanding hearing in a broad range of marine species is therefore critical on several fronts. In this session, papers will address response differences amongst species, impact and recovery parameters, auditory system modification through habitat shifts, and evolutionary adaptations. It has been persuasively argued that "hearing" evolved in aquatic animals. Auditory precursors are found in the statolithic organs of invertebrates and vestibular organs of fossil Agnatha, but it remains unclear when a dedicated acoustic receptor, a primordial "ear", first appeared, or multiple ears arose independently. Modern aquatic ears range from simple acoustic pressure receptors to complex biosonar processors. Species specific auditory system components dictate hearing abilities that in turn evolved from selective pressures for detecting passive and active "auditory scene" cues. Thus, we see common, preserved features but increasing structural and mechanical complexity as ears changed from papillae to cochleae, achieving broader ranges, sharper tuning, and improved localization but potentially increased noise susceptibility.