

Bioacoustic traits of endangered Hawaiian monk seals: sound production and reception

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Hawaiian monk seals have been isolated for more than 10 million years and display auditory anatomy that is less derived than other true seals. Their auditory biology is compelling from behavioral, conservation, and evolutionary perspectives—however, descriptions of species-typical sound production and reception are limited. Our recent research has sought to consider key bioacoustic traits of this species within a comparative framework. To address knowledge gaps concerning hearing abilities, we evaluated two mature Hawaiian monk seals using behavioral methods. Detection thresholds were measured for narrowband tones both underwater and in air. One individual had relatively poor terrestrial hearing, with thresholds above 40 dB re 20 μ Pa and a functional hearing range from 0.1 to 33 kHz. Under water, best sensitivity extended from 1 to 25 kHz, with reduced high-frequency hearing relative to other species. While low-frequency hearing was better than reported previously, hearing at all frequencies was less sensitive than in other seals. To evaluate sound production, an acoustic recorder was used to characterize spontaneous vocalizations and seasonal trends in calling. Seals regularly produced six different underwater calls with spectral energy below 1 kHz. Calling patterns reflected a period of heightened reproductive activity lasting more than seven months. This work—which is ongoing—is establishing a comprehensive understanding of amphibious hearing and communication for the species and will enable improved assessments of noise effects on these endangered seals.

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