

Testing the hypothetical reasons for inappropriate responses to the candidate mechanisms for the unexplained seal deaths

Marine Mammal Scientific Support Research Programme MMSS/001/11

USD 3 Report

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Executive Summary

The primary aim of this investigation was to establish whether the acoustic properties of ducted propellers had an attractive quality to seals. Ducted propellers were identified as a candidate, causal mechanism for the unexplained seal deaths in Onoufriou & Thompson (2014). However, the means by which a seal would come into contact with a propeller remain unclear. The hydrodynamic qualities of a ducted propeller mean that seals must be voluntarily swimming to within a few metres for an unavoidable collision to occur.

Sound exposure experiments were carried out on both harbour seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) in both wild and captive situations. Target seals were exposed to recordings of ducted propellers, open propellers and harbour seal mating calls.

In the wild, seal responses were monitored with active sonar to detect any approach to the sound source. In the captive trials seals choice of feeding location and behaviour close to and remote from the sound source were monitored using video recordings.

No response was detected by any seal to the exposures. In the wild, no seals approached the speaker and with the captive seals the primary drivers appeared to be feeding rather than exploration of the sound producing device. Even with the removal of the feeding stimulus, no behavioural response as a direct result of sound exposures was observed.

If ducted propellers are a cause of the spiral injuries in seals then the results of this study would suggest the manner by which the interaction occurs is not the result of an acoustic attraction. The stranding of a grey seal test-subject with spiral lesions two days after release from the captive facility indicates either (a) at least one individual was susceptible to the attractive qualities of ducted propellers and those qualities were not replicated in this experiment, or (b) that acoustic signals are not involved in attracting seals to the mechanism causing the spiral lacerations.