

**Behavioral responses of beaked whales and other cetaceans  
to controlled exposures of simulated sonar and other  
sounds**

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Beaked whales have mass stranded during a few military exercises involving the transmission of active, mid-frequency tactical sonar, but the cause is unknown. A series of experiments was conducted during 2007 & 2008 on a specialized acoustic range [including 80+ elements capable of recording up to ~48 kHz covering ~600 sq. miles] in the Tongue of the Ocean, Bahamas to provide empirical measurements of the behavioural responses of beaked whales and other odontocete cetaceans to simulated mid-frequency military sonar signals and other sounds (including killer whale (*Orcinus orca*) and pseudo-random noise signals). A total of nine playback sequences (including measurements during “control” and “exposure” intervals) were conducted on four species of odontocete cetacean [Blainville’s beaked whale, *Mesoplodon densirostris* (n=2); Melon-headed whale, *Peponocephala electra* (n=1); short-finned pilot whale, *Globicephala macrorhynchus* (n=4); false killer whale, *Pseudorca crassidens* (n=2)]. Responses were measured using archival acoustic tags (D-tags), visual observations, and using the bottom-mounted hydrophones in the Tongue of the Ocean. The beaked whale results demonstrated statistically significant changes in most dive variables measured following both MFA and control exposures, but no difference in those measured before playbacks. Responses were similar irrespective of the sound played and there was evidence of directed swimming away from the sound source location following controlled exposures. Other species tested appeared less sensitive to MFA and control sounds than beaked whales. Our results demonstrate that useful scientific information can be obtained safely through controlled exposure experiments on beaked whales and a range of other species without causing maladaptive responses. However, small sample sizes mean that additional studies, including directed playback studies integrated with opportunistic studies around real operations, are required to confirm the generality of these results.