

Dear OCR Community and Friends

Nature journal filed a Freedom of Information Acts (FOIA) request for a Navy report on the impacts of Sonar on whales. The article is below and is remarkable because it indicates behavioral effects, not just catastrophic effects such as stranding or "embayments."

It also discusses Peter Tyack's hypothesis that beaked whales are responding to the sonar signals as a "mimic" signal to orca vocalizations - their top predator.

Regards,

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Sonar does affect whales, military report confirms

Animals stopped vocalizing and foraging for food during marine exercises.

[Daniel Cressey](#)

Whales subjected to military sonar will neither dive nor feed, according to an unpublished 2007 report from the UK military, obtained by Nature after a request under the Freedom of Information Act 2000.

The impact of sonar on whales has become an increasingly fraught issue in recent years, with submarine exercises being linked to several high-profile mass strandings. The US Navy has admitted concerns over sonar's effects on marine mammals, although actual evidence for harm has been in short supply.

Submarines' sonar has been implicated in whale strandings. Punchstock

But military-sponsored tests now suggest that low levels of sonar, which do not cause direct damage to whales, could still cause harm by triggering behavioural changes.

The UK military report details observations of whale activity during Operation Anglo-Saxon 06, a submarine war-games exercise in 2006. Produced for the UK's Defence Science and Technology Laboratory, it states the results are "potentially very significant".

The study used an array of hydrophones to listen for whale sounds during the war games. Across the course of the exercise, the number of whale recordings dropped from over 200 to less than 50. “Beaked whale species ... appear to cease vocalising and foraging for food in the area around active sonar transmissions,” concludes the report.

It notes, “Since these animals feed at depth, this could have the effect of preventing a beaked whale from feeding over the course of the trial and could lead to second or third order effects on the animal and population as a whole.”

The report references a second military document from 2005, also seen by Nature, which explains that these second- and third-order effects could include starvation and then death, depending on the severity of the sonar's initial effect on the whales.

A spokesperson for the UK’s Ministry of Defence (MoD) said in a statement: “Active sonar releases energy into the ocean, and there is evidence to suggest that this may have an effect on marine mammals. However, the precise scientific effects are not clear, thus the MoD has adopted a precautionary approach to mitigate effects on the marine environment. Environmental Impact Assessments are mandatory prior to the use of military sonar, and the ability to predict and detect marine life continues to be developed in order to minimise any perceived threats to marine life.”

Hidden details

Several details in the 2007 report, such as the location of the exercise and its participants, have been removed under section 27 of the UK’s freedom of information legislation, which governs information that might prejudice international relations. However, it is clear that a number of countries took part in the exercises, which involved at least four warships hunting two nuclear-powered submarines.

Although the location of Operation Anglo-Saxon 06 has been removed from the report, the pattern of hydrophones shown in one diagram matches that in the US Navy’s AUTEK range in the Bahamas.

Because the author’s name has also been removed, Nature was not able to contact them for comment, nor assess the degree of peer review the report may have undergone. However, research from respected marine scientists is also beginning to come to the same conclusions as the anecdotal evidence detailed in the military report, showing that whale behaviour is modified by sonar, even if it is not yet possible to say that behavioural changes equate to actual harm.

Submarine or killer whale?

At the Acoustics 2008 conference held in Paris in late June, Peter Tyack of the Woods Hole Oceanographic Institution in Massachusetts reported on a groundbreaking study that also took place in the AUTEK range. The study monitored the response of a tagged

beaked whale to both sonar and killer-whale calls, at levels that would not pose any risk to the animals.

Data recorders were attached to the whale with suction caps to log its location. Combined with information from the hydrophones, the researchers were able to monitor the response of the whale to sounds.

The whale showed similar, although weaker, responses to sonar as it did to killer-whale calls: it stopped foraging with echolocation shortly after it heard them. This suggests that this anti-predator response may ultimately harm the animals, although the levels of noise were unlikely to cause direct injury.

“We know that sonar is linked to strandings, but we do not know the cause of the chain of events from sonar exposure to stranding,” says Tyack. “The number of whales known to have been harmed by sonar is relatively small, but until we know exactly how whales respond to sonar, and what sound exposure causes these responses, we cannot assess the full scope of the problem.”

Ian Boyd, an expert on marine mammals at St Andrews University, UK, worked with Tyack on the response study. He says that it is possible to mitigate the effects of sonar by using forms that sound less like predators, for example, or simply by moving military exercises away from whales.

“We need to start doing some of these sorts of things,” he says. “But we need to do it within the context of an experimental set-up where we can genuinely test the extent to which there is disturbance to these animals, and potentially test new types of sonar signals, because they may only be sensitive to certain types of signal.”