

## Inappropriate use of low frequency acoustic sound

### NAME(S):

» Environmental impacts of low frequency active sonar

### NATURE

Low frequency sound propagated in water loses little of its intensity with distance. Many aquatic animals use sounds for communication and are may be particular vulnerable to high levels of sound. Low Frequency Active Sonar (LFAS) consists of very loud, very low-frequency sounds designed to carry long distances underwater. It was developed by the Navy to detect submarines across large distances. Observers have reported negative impact on marine life from this type of sonar, specifically on the feeding, migration and breeding behaviours of humpback whales and sea turtles.

### BACKGROUND

Observers have long claimed negative impacts of very loud sound on marine mammals. Whales have been known to change their migratory patterns when encountering manmade sounds as "low" as 120dB, such as those produced by underwater oil-drilling. After WWI the Norwegians noticed that sonar frightened whales, and especially baleen whales. They developed special sonars which they used to produce predictable flight responses in the whales which made them easier to catch.

The US National Oceanic and Atmospheric Administration grants the Navy an exemption from federal rules that guard marine mammals from incidental injury. The agency concluded that protective measures required of the Navy will ensure that the effects of the sonar will be "negligible" and will not undermine the long-term health of whales and other ocean mammals. However, the five-year authorisation requires the Navy to investigate unanswered questions regarding how the low-frequency sonar affects whale behaviour, and whether it can silence the songs of large whales in particular. It also forbids the Navy from using the system when ocean mammals are within 1.1 nautical miles, since the force of the noise can damage their hearing and disrupt their activities within that range.

### INCIDENCE

In 1987, dolphins exposed to 235 decibels of sonar stranded and were found to suffer from tissue and lung explosion. LFAS levels planned for use by the US Navy are reported to start at 180 decibels in areas near shore and could be considerably higher in open waters. In 1997/98, 7 out of 8 swimmers in the vicinity of the US Navy's LFAS testing in Hawaii reported becoming sick with a variety of symptoms ranging from nausea, diarrhoea, dizziness and chest congestion. Many were seasoned swimmers and a number had not been swimming at the time, but on the beach.

A study published in [Nature] suggests that similar tests, possibly causing tissue explosion, may have been responsible for a mass stranding of around 200 Cuvier's beaked whales in the Ionian Sea (Mediterranean Sea, near Greece) in 1996. Documentation exists that twelve of the stranded whales were exposed to NATO sonar at 150-160 decibels. Other strandings linked to sonar activity include: (1) The Bahamas (14 March 2000), mass dolphin and whale strandings coincided with US low frequency active sono-buoy testing. Tests on these whales proved that they had died from brain cavity, ear, and other tissue explosion. (2) In February 2000, hundreds of dolphins began washing up on European shores. (3) On 21 January 2000, hundreds of dolphins beached along the Atlantic coastline (especially Florida); some suspect NATO sonar in the general area may be the cause. In the previous month there had also been incidences of dolphins washed up dead on the northwest Florida coast. (4) Virgin Islands (October 2001) sonar sounds followed by multiple cetacean strandings in the area. (5) Canary Islands - a total of 21 whale strandings in 1985, 1988, and 1989 were linked to visible US Navy manoeuvres. (6) Haro Strait, San Juan Islands (summer 1996) 195 decibels were sent into this key waterway used by orcas, porpoises, seals, and other mammals, followed by an increase in strandings of these mammals. A news service recently reported that the previously thriving orca population from this area is now in enough trouble to be considered eligible for the Endangered Species list. (7) Hawaiian Islands (1998), three whale calves and one dolphin calf were found dead or abandoned during and immediately following sonar testing, even though in 15 years of research this phenomenon had never been observed. (8) Since the open testing in California began in 1997, sonar exposed whales immediately began to strand in increased numbers. In addition, there was a report of uncharacteristically aggressive behaviour which is known to be a symptom of LFAS exposure. In 1999, more than 150 grey whales were found dead due to starvation along their migratory route where testing took place in 1998. Starvation could have been the result of deafness. (9) Rumour has it that the Australian government has questioned a connection between observed US Navy and NATO manoeuvring and strandings off their shores.

### CLAIM

1. The tests conducted off the island of Hawaii, at volume levels of less than 155dB, far below the levels the US Navy will use should the system be deployed, have demonstrated that this system adversely affects marine mammals and can cause harm to humans (multiple reports of disorientation and loss of equilibrium in people who were in the water when broadcasting was underway.) The intended sound level for deployment in the oceans is 235 dB -- thousands of millions times louder than sounds known to damage living tissue. The system should not, therefore, be deployed.

2. In view of indications that brain and body tissue explodes and body cavities (bladders, lungs, and ear canals) rupture when exposed to sonar blasts, it is plausible to assume that most affected marine mammals will sink to the ocean floor, rather than make their way to a beach. And who knows what the effect this risky technology has on the thousands of other, smaller forms of marine life, less able to withstand such a powerful force. Brain and tissue fissures, lesions and ruptures as well as mass starvation consistently found in beached marine mammal corpses resemble the symptoms of sonar exposure described by the Marine Mammal Commission when, in 1997, it predicted that "...lung and tissue haemorrhage and trauma in marine mammals (and fish) as well as cavity explosion and hearing loss causing subsequent starvation was likely to occur if LFAS was employed worldwide as proposed."

### BROADER

- » Marine noise pollution
- » Vulnerability of marine ecosystems
- » Environmental impacts of defence industries
- » Disturbance to wildlife patterns of movement

### RELATED

- » Harmful effects of ultrasonic radiation on the human body
- » Electronic interference
- » Torture by continuous noise
- » Health hazards of environmental electromagnetism

### AGGRAVATES

- » Whale beaching
- » Endangered soundscapes
- » Threatened marine animals

### AGGRAVATED BY

- » Inadequate environmental impact assessment
- » Environmental impacts of the use of wind power

### WEB PAGE(S)

- » UNESCO: Noise Pollution (pdf)

### ORGANIZATION(S)

- » North Atlantic Marine Mammal Commission

### STRATEGY(IES)

- » Improving military technology
- » Protecting against vulnerability of marine animal communication
- » Removing unnatural barriers to movement of natural populations
- » Conserving endangered species of marine mammals
- » Improving maritime communications

### VALUE(S)

- » Abuse
- » Inappropriateness
- » Infrequent
- » Lowness

- » Underuse
- » Unused

**TYPE**

(E) Emanations of other problems

### About the Encyclopedia

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