

SURTASS LFA Sonar

Questions and Answers

How did NOAA Fisheries determine whether or not to grant the permit for the Navy to use SURTASS LFA in our country's waters?

NOAA Fisheries scientists determined that, based on the best science available, SURTASS LFA sonar will have no more than a negligible impact on marine mammal species and stocks. They looked at research already conducted by the Navy and others, and research the Navy plans to do in the future to reduce or to avoid harming marine mammals during use of LFA.

What is NOAA Fisheries goal?

NOAA Fisheries is dedicated to protecting and preserving our Nation's living marine resources through scientific research, management, enforcement and the conservation of marine mammals and other protected marine species. The goal of the MMPA is to allow human activities while protecting marine mammals provided certain criteria can be met. NOAA Fisheries scientists are studying marine mammal issues carefully, with the ultimate goal of protecting marine mammals.

What protections are marine mammals given in this country's waters?

Marine mammals are protected under the Marine Mammal Protection Act (MMPA), and in many cases the Endangered Species Act. The MMPA established a moratorium, with certain exceptions, on the taking (harassment, injury or mortality) of marine mammals in U.S. waters and by U.S. citizens on the high seas, and on the importing of marine mammals and marine mammal products into the United States. One of these exceptions is for the taking of marine mammals incidental to non-fishing activities provided certain conditions have been met.

What happens now?

NOAA Fisheries determined that marine mammals will be protected from injury and mortality by the SURTASS LFA sonar activities, and that LFA sonar will have no more than a negligible impact on marine mammal species and stocks. NOAA Fisheries granted the Navy a "*small take authorization*" under the Marine Mammal Protection Act. NOAA Fisheries will review the permit on an annual basis, and based on monitoring and reporting records kept by biological observers and Navy personnel operating the LFA equipment, NOAA Fisheries will assess impacts on marine mammal populations before reauthorizing the permit for the next year.

What is the SURTASS LFA system?

The SURTASS LFA sonar system is a long-range, low frequency sonar that has both active and passive components. The Navy will use it to help them locate very quiet submarines.

What kind of research has the Navy done to test this system on marine mammals? What did the results show? Were animals affected, and how much?

The scientific research program for determining impacts on large whales (those species potentially most susceptible) from SURTASS LFA sonar which focused on blue and fin whales in the southern California Bight (Sept-Oct. 1997), gray whales migrating past the central California coast (January 1998), and humpback whales off Hawaii (February-March, 1998) detected only minor, short-term behavioral responses. A description of this research is available at: <http://www.surtass-lfa-eis.com/Research/index.htm>

Since there are many issues that seem unanswered, will the Navy be required to continue to conduct research on the impacts of LFA sonar on marine mammals?

Yes. During the next five-year period, NOAA Fisheries is requiring the Navy to conduct research on (1) the behavioral reactions of whales to sound levels that were not tested during the earlier research phase, specifically between 155 dB and 180 dB; (2) the responses of sperm and beaked whales to LFA signals; (3) the habitat preferences of beaked whales, and plan future SURTASS LFA training exercises to avoid such areas; and (4) passive acoustic monitoring for the possible silencing of calls of large whales using bottom mounted hydrophones before, during, and after SURTASS LFA training operations. To determine long term, cumulative effects, scientists will select a stock of marine mammals that is expected to be regularly exposed to SURTASS LFA sonar, and monitor it for population changes throughout the five-year period.

Isn't this system going to add to the problem of increasing levels of sound pollution in the ocean?

SURTASS LFA sonar noise will make up a very small part of the human-caused noise pollution in the ocean. There are two types of noise in the ocean, natural and anthropogenic (human-caused). Natural noise is caused by wind, waves, rain, earthquakes, and marine life. Human-caused noise is created mostly by shipping and in inshore waters by seismic and construction, and recreational boaters. Both ships and boats have sonar noise, in addition to vessel noise from their engines and props. Therefore, by definition, all noise sources, natural and human caused result in the total level of background noise in the oceanic region in which it takes place.

SURTASS LFA sonar however, is a coherent low frequency signal with a duty cycle of less than 20 percent, operating for a maximum of only 432 hours/year for each system or a total of 32 days/year. This compares to an approximate 21.9 million days/year for the world's shipping industry (presuming an 80 percent activity rate all the time). Thus, SURTASS LFA sonar noise would make up a very small part of the human-caused noise pollution in the ocean.

Is LFA sonar the same as the sonar that caused the beaked whale stranding in the Bahamas a few years back?

No. SURTASS LFA is a different kind of sonar. The sonar that caused the beaked whale stranding in the Bahamas in 2000 is the standard tactical sonar used by Navy warships for the past 20-30 years.

How will the Navy be able to detect marine mammals in the safety and buffer zones, especially at night, in fog and in deep-diving marine mammals?

During SURTASS LFA sonar operations, the Navy will: (1) conduct visual monitoring from the ship's bridge during daylight hours, (2) use passive SURTASS sonar to listen for vocalizing marine mammals; and (3) use high frequency active sonar (i.e., similar to a commercial fish finder) to monitor/locate/track marine mammals (called the HF/M3 sonar) in relation to the SURTASS LFA sonar vessel and the sound field produced by the SURTASS LFA sonar. These measures should result in almost 100 percent effectiveness in locating all marine mammals, prior to their potentially being injured. Because the 24-hour, all-weather HF/M3 sonar was developed and will be used specifically to address the low efficiency of visual monitoring, and because it will be over 95 percent effective in detecting marine mammals prior to entering the 180-dB mitigation zone, there is no need to consider limitations on operations due to visibility concerns.

Why do so many people, including environmentalists, fishers and scientists oppose the use of LFA?

While a number of environmental groups oppose LFA sonar, NOAA Fisheries is unaware of any organized opposition by commercial and recreational fishers. Such opposition is also unlikely since fishers are well aware of their need to also use sonars in order to locate fish schools. Also, as members of the public, these groups were offered an opportunity to express their concerns during the comment period on the Navy's Draft Environmental Impact Statement (EIS) and NOAA Fisheries' proposed rule on this action. All concerns have been addressed by the Navy as part of its Final EIS on the proposed SURTASS LFA sonar deployment. Finally, the extensive comments NOAA Fisheries received during its 73-day public comment period on the proposed rule have been addressed in the final determination and rulemaking document.

Why is this system needed now?

That is a question that should be addressed to the Navy. However, according to the Navy, the SURTASS LFA sonar provides a reliable and dependable system for improved detection and tracking of new-generation submarines at a longer range.

Is it true that the Navy plans to construct 23 more LFA sonar vessels?

The SURTASS LFA sonar system will operate a maximum of two ship systems in the world's ocean regions. While the Navy originally proposed a maximum of four LFA sonar systems, and discussed the impacts of four systems in its Draft and Final Environmental Impact Statements (EIS), due to budget constraints, only two systems will be available during the next five years (the time period for the MMPA regulations). Therefore, NOAA Fisheries has assessed impacts for only two systems, not four.

Is it true that SURTASS LFA sonar will affect 80 percent of the world's oceans.

The Navy has asked for an authorization to harass marine mammals incidental to operating SURTASS LFA sonar in approximately 80 percent of the world's oceans. This does not mean that SURTASS LFA sounds will simultaneously affect 80 percent of the ocean. The SURTASS LFA sonar sound descends from the ship towards the sea bottom, and then rises to the sea surface in a series of narrow ridges about 25-33 miles apart. Eventually the sound drops below ambient (natural noise level affected by ocean sounds, biologies and wind). The sound level that can have a significant effect on whale behavior is probably restricted to the first of these rings at 25-33 miles from the ship. The sound level that is potentially capable of injuring animals is within 1 km or 0.54 nm of the ship. Therefore, while the ship(s) may operate in 80 percent of the world's oceans, the SURTASS LFA sonar has the potential to affect whales at relatively close distances to the ship.

Some have compared SURTASS LFA sonar to being a billion times louder than a Boeing 747 jet on takeoff.

Comparing sound levels in air against sound levels in water must be done very carefully. First, due to accepted convention, the reference pressure values are different by 26 dB. Second, due to the relative impedance of air vs. water (the stiffness or density of the medium), roughly a 3,500 times greater power level (35.5 dB) is necessary in air versus water to produce an equivalent pressure level. Combining these two values, a 61.5 dB difference, or correction factor, between the two scales is required. Therefore, 61.5 dB must be subtracted from a sound level in water to produce an equivalent acoustic intensity in air. A 60-dB difference represents a million-fold power difference; so it can easily be seen how misleading it can be to try and compare underwater sound with in-air sounds.

Within a few hundred meters, SURTASS LFA sonar is approximately the same as a 747 engine (if one could operate underwater) at an equal distance. Beyond 200 m, LFA forms a slim, omnidirectional beam. Outside this beam, at any given distance, the SURTASS LFA sound is again comparable to a jet engine from an equal distance. Inside the beam, LFA is about 30 dB louder than the jet engine would be at a comparable distance. Since humans do not hear on a logarithmic scale, a human would perceive this 30 dB difference as about six times louder, not a billion times.

The 180-dB safety zone for protecting marine mammals is not based on science, but instead was invented for SURTASS LFA sonar.

The 180-dB safety zone for the exclusion of marine mammals was recommended for impulse noise sources by an expert panel in 1997 at Pepperdine University for seismic operations in California. Although it is true that no single study has proven the safety of this level for marine mammals, several lines of research suggest that the 180-dB level makes common sense given their environment. For example, 180 dB is about one-half the sound pressure level that an animal would receive from a nearby vocalizing blue whale, which is about 186 dB at its source. Moreover, NOAA Fisheries has implemented a buffer zone shutdown criterion wherein the Navy will suspend transmissions whenever a marine mammal is detected within 1 km (0.54 nm) of the 180-dB safety zone. This means that marine

mammals will be protected from LFA sonar transmissions at a sound pressure level at least 50 percent less than they would receive at 180 dB.

Won't we see even more strandings of marine animals like we saw in the Bahamas when the Navy starts using this system throughout the worlds oceans?

The Navy's SURTASS LFA sonar system will not be deployed so that loud sounds (i.e., greater than 180 dB) will occur within 12 nautical miles of any coast including offshore islands anywhere in the world. In addition, it will not operate in certain designated Offshore Biologically Important Areas, such as the critical habitat for northern right whales off the U.S. East Coast, the subantarctic convergence zone off Antarctica, the Costa Rican dome off Central America and Penguin Bank off Hawaii. However, because of its offshore operations, and the relatively small area where marine mammals might be harmed and the visual, passive acoustic and active acoustic (fish-finder-like sonar) monitoring that will be employed, it is very unlikely that there will be strandings associated with SURTASS LFA sonar operations. NOAA Fisheries will be coordinating with the U.S. stranding networks along whichever coast(s) LFA sonar is operating to ensure that strandings, if any, will be investigated.