Testimony to U.S. House of Representatives,

Subcommittee on Fisheries Conservation, Wildlife and Oceans

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I have been asked to comment on the US Navys use of SURTASS LFA sonar, as well as other sonar technologies, and their possible effects on marine mammals. I am very grateful to you for offering me this opportunity.

I have been studying the population biology of whales, especially sperm and beaked whales, since 1975, and have published over 100 papers in refereed journals. I am Killam Professor of Biology at Dalhousie University and a member of the Cetacean Specialist Group of IUCN, which allocates conservation priorities for whales and dolphins globally. I am also a member of the Committee on the Status of Endangered Wildlife in Canada, which assesses the status of species of animals and plants, and Co-chair of its Marine Mammal Subcommittee

I will make these comments on the potential effects of military sonars from the perspective of a population biologist. We as a society, and you as lawmakers, are concerned about how human activities in the ocean affect the health and viability of populations, species and ecosystems. These questions are in the realm of population biology.

Sound is, in many ways, the best channel for communication and sensing in the ocean. It travels over long distances and can convey a great deal of information. Marine mammals and other ocean animals have evolved to use sound efficiently for sensing their environment, detecting prey and predators, finding and attracting mates, and keeping in touch with their social partners and young. This is especially the case for the odontocete or toothed whales which have sophisticated sonars and social systems. They are critically dependent on sound. As my wife and colleague, Dr Linda Weilgart, has put it A deaf whale is a dead whale.

For some of the same reasons that sound is important to marine mammals (communication, sensing the environment, predators and prey) it is used by navies. Even before the development of LFA systems, the amount of noise in the oceans increased dramatically from human activity. Of the various types of noise that we are introducing into the ocean, military sonars have some features of special concern, such as high intensities and frequencies within the range that are commonly used by marine mammals. It can have a range of consequences for ocean life from rupture of organs, through permanent hearing loss, temporary hearing loss, disturbance, masking of sounds, and psychological effects. All of these channels, and especially when they act in combination, may have population level consequences.

How can the research community assess these potential consequences in order to guide you as lawmakers? The key issue you must understand is that studies of some potential effects of some sounds on some species, such as research on ear structure after sound exposure, and the US Navys LFA whale research program, inform us very little about the population effects of sounds. There are about 70 species of whale and dolphin, noises vary greatly in frequency, intensity and other characteristics, and can produce population level effects through at least the six different routes just noted. It is also important to realize that animals

can be injured by sounds which they cannot hear.

The Navy-sponsored studies of four species of baleen whale to reduced-power LFA sources showed clear behavioral responses (e.g. Miller et al. 2000). But this tells us almost nothing about the population effects of the full source on sperm and beaked whales, which are, for many of us, the most obvious area of concern.

Studying the population biology of any oceanic species is very difficult, but there are data on how ocean noise can produce population-level effects. In March 2000, a multiple-species stranding of beaked and other whales took place in the Bahamas following, and, as is now clear, as a result of, naval exercises. There has been a lot of attention paid to the anatomical studies of the stranded animals, and these are important. But, for a population biologist, the key statement in the report is None of the Cuviers beaked whales that we had documented in our nine-year study have returned since the March 15 naval exercise... We consider it entirely plausible that most, if not all, of the local population of this species was killed on that day... (Balcomb and Claridge, 2001). We know little of beaked whale population biology, but evidence from the Bahamas project and the only other long-term study of a beaked whale population which my group carries out off Nova Scotia (Gowans et al., 2000) indicates that these animals may generally occur in small local populations near the edges of the continental shelves. Such populations would be very vulnerable to these kinds of events.

Some maintain that the Bahamas stranding was a one-time event, caused by special oceanographic circumstances, but another recent publication shows that this is not the case. The International Whaling Commission (2001) reports that 8 out of 49 beaked whale strandings (1838-1999), and 6 out of 6 multiple species beaked whale strandings (1974-1999), occurred with military activities. For a population biologist these are scary numbers, and strongly suggest that naval activities, and the sounds that accompany them, are frequently lethal to beaked and other whales and have population-level consequences.

What about LFA? LFA is of lower frequency than most other sonars, and has increased range. The US Navy has not, to my knowledge, provided useful ranges. However, 120db is the level at which marine mammals often display clear reactions to noise. Competent bioacousticans have calculated that LFA reaches 120db at 500km from the source. Thus any LFA transmission could potentially affect an area of about the size of Texas. This again is scary for a population biologist.

Because LFA is of a lower frequency than the sonars that operated during the Bahamas stranding, it is sometimes concluded that it will not be dangerous. This is wrong. We know so little of how sound affects populations of marine life that we cannot conclude that LFA will be better or worse than other sound sources, but the huge range at which it may be a threat is of grave concern.

To sum up, we know that more noise is generally bad, and there is quite good evidence that military sonars can have population level effects on whales. Because of the difficulties of studying population level effects directly, the scientific community is unlikely to be able go very much beyond these summary statements in the medium term. In this case, as so often in the marine environment, you must regulate and manage based upon imperfect knowledge. I cannot make a professional assessment of the military merits of LFA sonar, but there is good reason to believe that it could have a severe population-level impact on marine life.

References

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