

**MARINE MAMMAL COMMISSION**  
4340 EAST-WEST HIGHWAY, ROOM 905  
BETHESDA, MD 20814

18 March 2005

Mr. P. Michael Payne  
Chief, Marine Mammal Conservation Division  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, MD 20910

Dear Mr. Payne:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the public scoping notice (70 *Federal Register* 1871) regarding the Service's intent to prepare an environmental impact statement (EIS) on new acoustic exposure criteria. The purpose of the EIS is to "analyze the potential impacts of applying new acoustic exposure criteria ... to determine what constitutes a 'take' of a marine mammal ... as a result of exposure to anthropogenic sound in the marine environment." The Commission supports the Service's effort to develop acoustic exposure criteria that can be applied predictably to diverse management situations.

The development of a framework for acoustic exposure criteria is clearly a challenge due, in part, to the lack of information on the use of sound by the diverse species of marine mammals and the potential effects of the various types of anthropogenic sounds to which they are exposed. The matrix framework being proposed provides a long-needed mechanism for decision-makers to incorporate the best available information on sound effects, tailor their decisions to the specific sensitivities of marine mammals to various types of anthropogenic sound, and identify areas of uncertainty that would benefit from future research. The planned EIS provides a mechanism to explain to decision-makers the benefits and possible shortcomings of this new framework and to engage the public in this issue. To support the goal of an EIS that is sufficiently broad and comprehensive, we offer the following suggestions regarding its scope.

**Application of the exposure criteria**—The manner in which the new criteria will be used is not clear. The EIS should specify whether the criteria will be used as hard and fast rules for distinguishing between anthropogenic sounds that will and will not be considered a taking or, alternatively, whether they will be used flexibly with other management tools (e.g., Endangered Species Act consultations, small-take and incidental harassment authorizations, enforcement actions) to assist the Service in making determinations based on particular circumstances. The distinction is important. The Commission encourages the Service to specify precisely how it intends to use the proposed exposure criteria.

**Assumptions and extrapolations**—The existing lack of understanding of how marine mammals use and interpret their own underwater vocalizations and the effects of anthropogenic sound on them requires the drafters of the criteria to make certain assumptions and extrapolations

to develop the matrix framework. The EIS should explain the nature and extent of those assumptions and extrapolations to ensure that decision-makers understand the basis for the matrix, the unavoidable uncertainty associated with it, the resulting risks if the matrix assumptions and extrapolations are not correct, and the need for future research to refine it. In particular, we urge the Service to carefully explain how acoustic criteria developed from empirical data largely drawn from a few small to mid-sized odontocete and pinniped species can adequately protect all marine mammals. The behavioral and physiological impact of sound will depend on the sensitivity of the animal to the frequency of the sound. We suggest that the Service explain if and how the matrix will accommodate the extent of overlap between the hearing abilities of the various species and the frequency-dependent characteristics of any acoustic stimulus of concern. In addition, we also suggest that the Service explain if and how the matrix will be used to take into account distances over which sounds may be heard by marine mammals, particularly in shallow waters where sound propagation is difficult to model and predict.

**Types of effect**—The potential effects of sound are often categorized into those involving physical injury (e.g., permanent threshold shifts) or even death, temporary loss or reduction of physiological function (e.g., temporary threshold shifts), changes in behavior, and masking of competing sounds. These “effects categories” do not have clear boundaries and, more often than not, overlap, particularly when they involve behavior. Recent findings indicate that behavioral effects (1) are likely to be more common than physiological effects and (2) can lead to potentially severe impacts such as stranding, changes in diving patterns possibly leading to decompression sickness, and changes in habitat use patterns. Therefore, the EIS should discuss how the Service will assess and interpret behavioral modifications that marine mammals may exhibit as a result of short-term exposure to intense sound sources as well as long-term exposure to increased background or ambient noise levels, which may lead to chronic disturbance or masking.

**Detection of effects and refinement of the matrix**—One advantage of the matrix approach is that the matrix can be refined as the effects of sound become better understood. Ultimately, such refinement should reduce the level of uncertainty surrounding the exposure criteria and the potential risks to marine mammals that result from such uncertainty. The utility and adaptability of the matrix will depend on whether significant effects on marine mammals are detected and used to refine the matrix. For that reason, the EIS should evaluate proposed exposure criteria (e.g., 50 percent avoidance behavior, alternative III) based, in part, on whether or not they can be measured and assessed to provide the essential feedback.

**Long-term effects**—A single exposure to an intense anthropogenic sound may have adverse effects on marine mammals. Repeated or continuous exposures to less intense sounds also may have adverse effects, and those effects may be significant if they cause long-term behavioral changes or abandonment of preferred habitat. Coastal species, particularly those located near areas of dense human activity (e.g., shipping, recreational boating) may be particularly vulnerable to chronic exposure to increasing ambient sound. Although such long-term effects may be significant, they may also be difficult to detect and attribute to sound. For example, it has been experimentally determined that belugas and narwhals in the Arctic may detect an approaching vessel for distances in excess of 20 km and be gone long before the vessel actually arrives. In such cases, unless persons were observing the animals prior to the disturbance, the possible negative effects would simply pass undetected. Further, the nature and intensity of anthropogenic sounds in the marine environment

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can reasonably be expected to change over time. For these reasons, the EIS should address the potential long-term effects of repeated or continuous sound exposures on marine mammals and how those might be measured.

**Range of alternatives**—The value of an EIS stems in part from the alternatives that are chosen. However, the proposed alternatives are so disparate that analyses of them may not illustrate the subtleties of the issues and provide meaningful analyses for management consideration. For example, Alternative IV links Level B harassment to physiological change without consideration of intermediate behavioral effects that may be significant. Alternative III, the only alternative that addresses behavioral changes, relates Level B harassment to a 50 percent avoidance level, which seems extreme if it means that an exposure would not be considered harassment until 50 percent of the exposed animals abandoned preferred habitat to avoid the sound.

The first alternative, “no action,” would retain the existing standards. Because acoustic exposure data are not available for the majority of species, some might consider this alternative a more cautious approach than the proposed exposure levels in the matrix. The Service should explain why the matrix approach is an improvement over the existing standards and why those standards should not be retained, at least in part, as a conservative approach until more is understood about marine mammal hearing and the potential effects of anthropogenic sound on their behavior and physiology.

For these reasons, we encourage the Service to revise its alternatives to provide a suite of reasonable choices that clearly define the options to be reviewed. The Service maintains the option of selecting a final proposed action that has not been specifically analyzed in the EIS, so long as it is within the range of alternatives analyzed. Nevertheless, given all the variables being considered, the Commission urges the Service to identify its preferred alternative in the draft EIS and proposed action in the final EIS and to analyze both comprehensively.

The Commission would welcome the opportunity to discuss the above comments or other matters pertaining to the EIS with the Service. Please contact me if you have questions or require further information regarding our comments.

Sincerely,

A handwritten signature in black ink that reads "David Cottingham". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

David Cottingham  
Executive Director