



Society for Conservation Biology

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Nicole R. Le Boeuf,
Marine Mammal and Sea Turtle Conservation Division,
Office of Protected Resources,
National Marine Fisheries Service,
1315 East-West Highway,
Silver Spring, MD 20910-3226,

Attn: Acoustic Guidance Docket no. NOAA-NMFS-2013-0177 / NOAA-NMFS-2015-18790 / 81 FR 14095

Dear Ms. LeBoeuf,

On behalf of the Marine and North American Sections of the Society for Conservation Biology (SCB), please accept the following comments regarding the National Oceanic and Atmospheric Administration's (NOAA's) Proposed Changes to the *Revised Draft Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammals; Acoustic Threshold Levels for Onset of Permanent and Temporary Threshold Shifts* dated March, 2016 (hereafter, the 3rd Draft Criteria).

The SCB is an international professional organization whose mission is to advance the science and practice of conserving the Earth's biological diversity, support dissemination of conservation science, and increase application of science to management and policy. The Society's membership comprises a wide range of people interested in the conservation and study of biological diversity. Resource managers, educators, government and private conservation workers, and students make up the thousands of members worldwide. Therefore, both the scientific perspective provided by the SCB, and the research conducted by our organization's member scientists, are relevant to the proposed policy.

While we again congratulate NOAA on its tenacity in its approach to this task, we feel that the time allowed for consideration of the proposed changes was inadequate. Given the complexity, we consider 14 days to be insufficient. We would also like to express concern that the responses to earlier comments have not been provided. In particular, the references for (and on one occasion even the numerical value of) the sirenian data introduced in this 3rd Draft are missing. Without complete data and appropriate citations it is not possible to thoroughly assess the 3rd Draft.

Despite these omissions, we have identified a number of concerns, including several in addition to those that we have raised in our previous comments. The concerns with respect to the 3rd Draft Criteria have been arranged into sections. Specifically, the concerns relate to: (1) statistical failings; (2) lack of consideration of variability; (3) weighting functions that do not represent the hearing sensitivities of all



included species; (4) the impulsive to non-impulsive transition; (5) alternative criteria; (6) inverted audiograms; and (7) conflicts of interest.

1 Statistical failings

Although NOAA has made revisions to the low-frequency hearing group audiogram development methodology and the incorporation of dynamic range (defined in this case as hearing threshold to TTS onset), issues regarding pseudoreplication and other numerical inconsistencies remain present throughout the 3rd Draft Criteria, as outlined in our previous comments. **We strongly recommend that the procedure proposed in Wright (2015) be adopted.** Pseudoreplication persists, and thus leads to over-representation of single animals or species. We see no reason for NOAA to avoid addressing this. A desire to incorporate as much data as possible does not negate the importance of robust statistical treatments.

2 Lack of consideration of variability

The use of means and medians throughout the 3rd Draft Criteria remains an issue, as it does not account for variability in the data and leads to under protection of approximately 50% of all animals. We are unable to address NOAA's reasoning for this approach without the agency's response to our earlier comments, and would strongly argue for NOAA to adopt more rigorous and updated standards. Consideration of variation in hearing studies is already present (e.g., Castellote et al., 2014). We see no reason why variability should not be presented in Appendix A, and thus considered appropriately given the substantial amount of uncertainty. **We thus recommend that NOAA incorporate measures of uncertainty into Appendix A and consider this with the appropriate level of precaution.**

3 Weighting functions do not represent the hearing sensitivities of all included species

Despite the improvements to the low frequency hearing group audiogram (and to a lesser extent those of the other groups), and the associated weighting functions, issues remain with the coverage these provide. For example, the range of frequencies over which the blue whale produces sound is substantially down-weighted. Likewise, sperm whale hearing is likely not captured by the composite mid-frequency audiogram, especially as the lower edge of sensitivity (f_1) has been increased. **We again recommend the use of more precautionary audiogram and weighting "envelopes."**

4 Impulsive to non-impulsive transition

Given that there was no mention of this in the proposed changes, **we would like to restate our recommendation to remove this element from the 3rd Draft Criteria.**



5 Alternative criteria

Given all the various changes, it was not possible to re-assess the alternative criteria as they were not provided in the 3rd Draft Criteria. **Given this omission, we recommend a 4th comment period.**

6 Inverted audiograms

Footnote 7 suggests NOAA's defense of its weighting schemes, stating that they are wider than the inverted audiograms proposed for use elsewhere. However, this is misleading. The inverted audiograms have been proposed for use for **individual** species only, not entire functional hearing groups. **We find this comparison inappropriate and repeat our strong recommendation that the envelopes weighting functions be implemented instead.**

7 Conflicts of interests

It has been explicitly stated on several occasions throughout all versions that the US Navy has been driving the process that has resulted in the 3rd Draft Criteria. The 3rd Draft Criteria itself frequently includes statements along the lines of, "The Navy decided... and NOAA agree." We believe this to be a significant and troubling conflict of interest that effectively results in the US Navy writing its own regulations. As a consequence of this, **we recommend that the entire process be reconvened using a fully independent panel of experts.**

Respectfully submitted,

John A. Cigliano, PhD,
President, Marine Section, Society for Conservation Biology

Carlos Carroll, PhD,
President, North America Section, Society for Conservation Biology



Literature Cited

Castellote, M., Mooney, T.A., Quakenbush, L., Hobbs, R., Goertz, C. & Gaglione, E. 2014. Baseline hearing abilities and variability in wild beluga whales (*Delphinapterus leucas*). *Journal of Experimental Biology* 217:1682-1691. doi: 10.1242/jeb.093252. <http://jeb.biologists.org/content/217/10/1682>.

Wright, A.J. 2015. Sound Science: Maintaining Numerical and Statistical Standards in the Pursuit of Noise Exposure Criteria for Marine Mammals. *Frontiers in Marine Science*. *Frontiers in Marine Science (Marine Conservation and Sustainability)* 2:99. Published online 24 November 2015, doi=10.3389/fmars.2015.00099. <http://dx.doi.org/10.3389/fmars.2015.00099>.