



MAR - 4 2015

Dr. John Terhune
Biology, Department of Science, Applied Science and Engineering
Ganong Hall, 31
Saint John, New Brunswick, Canada
E2L 4L5

Dear Dr. Terhune:

On behalf of National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS), we thank you for agreeing to participate as a peer reviewer of the U.S. Navy's technical report entitled Auditory Weighting Functions and TTS/PTS Exposure Functions for Navy Phase 3 Acoustic Effects Analysis by J.J. Finneran. NMFS is currently evaluating the Navy's proposed methodology and considering its incorporation into the NOAA Acoustic Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Acoustic Guidance) and is requesting your expertise to evaluate the Navy's methodology before we do so. NMFS appreciates your willingness to help with this important effort to help us create national guidance based on the best available science.

Please note the specific requirements below. First and foremost, you must complete a conflict of interest disclosure form (attached) and provide your curriculum vitae (CV) to NMFS for our files as soon as possible. These tasks must be completed before the review begins.

Navy Technical Report Background:

For their Phase 3 Acoustic Effects Analysis, the Navy provided NMFS with a technical report describing their proposed methodology for updating auditory weighting functions. Their technical report describes the rationale and steps used to define the Navy's Phase 3 auditory weighting functions and numeric thresholds for predicting auditory effects (temporary (TTS) and permanent (PTS) thresholds shifts) on marine animals exposed to active sonars, other (non-impulsive) active acoustic sources, explosives, pile driving, and air guns utilized during Navy training and testing activities.

The Navy's proposed acoustic impact analyses use weighting functions to capture the frequency-dependency of TTS and PTS in marine mammals and sea turtles. The Navy's weighting functions for Phase 2 (Finneran and Jenkins, 2012¹) were based on the "M-weighting" curves

¹ Finneran, J.J. and A.K. Jenkins. 2012. Criteria and thresholds for U.S. Navy acoustic and explosive effects analysis. San Diego, California: SPAWAR Systems Center Pacific. www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA561707



defined by Southall et al. (2007²), with additional high-frequency emphasis for cetaceans based on equal loudness contours for a bottlenose dolphin. Since the derivation of the Navy's Phase 2 weighting functions, additional data has been published relating to marine mammal and sea turtle hearing abilities, equal latency contours, and TTS growth and recovery. Therefore, for the Navy's Phase 3 analyses, updated weighting functions were derived that take into account all relevant data and use the same approach for all species of interest.

NMFS is considering updating our NOAA Acoustic Guidance³ to reflect the Navy's updated methodology. The NOAA Acoustic Guidance is classified as a Highly Influential Scientific Assessment by the President's Office of Management and Budget. As such, independent peer review is required prior to broad public dissemination by the Federal Government.

General Directives:

NMFS is responsible for conducting this peer review. Any questions about this process or necessary follow-up with the Navy should proceed through the NMFS' Point of Contact (Amy Scholik-Schlomer). Please do not contact the Navy separately.

Please provide comments on the scientific information and data contained within the Navy's technical report.

1. If you believe that technical and/or scientific justification or conclusions are lacking or specific information was applied incorrectly in reaching conclusions, please be specific in your comments.
2. If you believe critical data sets or publications are missing from consideration, please identify them.
3. If there are any other factors that would significantly improve this document (i.e., organization, technical considerations, etc.), please let NMFS know.
4. If you require access to documents or information used in the preparation of the Navy's technical report, please let NMFS know.
5. Please provide your comments no later than **30 days after receipt of the Navy's technical report from NMFS**. However, if you identify major concerns, please let NMFS know as soon as possible.

² Southall, B.L., A.E. Bowles, W.T. Ellison, J.J. Finneran, R.L. Gentry, C.R. Greene, Jr., D. Kastak, D.R. Ketten, J.H. Miller, P.E. Nachtigall, W.J. Richardson, J.A. Thomas, and P.L. Tyack. 2007. Marine mammal noise exposure criteria: Initial scientific recommendations. *Aquatic Mammals* 33:411-521.

³ For more information on NOAA's Acoustic Guidance: <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>.
Note: You are not being asked to review this NOAA document.

Specific Topics of Interest for Consideration during the Peer Review:

During your review of the Navy's technical report, please consider whether the proposed auditory weighting functions and onset of PTS and TTS threshold levels appropriately account for uncertainty and variability associated with these datasets and functional hearing groups. Specifically:

- Whether the Navy's technical report represents the best available science and a reasonable interpretation of the current studies/datasets. Is this approach a logical outgrowth from previous proposed marine mammal auditory weighting functions (e.g., Southall et al. 2007 and Finneran and Jenkins 2012)?
- Whether the datasets for both marine mammal hearing capabilities and noise-induced threshold shifts are accurately summarized and complete.
- Whether extrapolations are appropriate based on available datasets.
 - In particular, whether low-frequency cetacean auditory weighting function, where direct data on hearing is nonexistent, is appropriate based on available knowledge (e.g., anatomical data) and whether low-frequency cetacean TTS and PTS onset thresholds are appropriate based on available knowledge, including ambient noise levels.
- Whether the treatment of behavioral vs. auditory evoked potential (AEP) methods used to obtain audiograms and measure threshold shifts is appropriate (i.e., is the exclusion of certain datasets appropriate or is there a means, either quantitatively or qualitatively, to incorporate all available data).
- Whether data from limited individuals is represented appropriately and whether extrapolation methods are appropriate for functional hearing groups or sound sources where no data are available.
- Whether the use of original and normalized threshold data, for various aspects of the methodology, is appropriate and necessary (i.e., many of the concepts in the report are present using both original and normalized data, which adds to the overall complexity of the report).
- Whether all aspects of the methodology are scientifically supported, as well as transparent and reproducible. Please also consider if the methodology clearly supports a means to incorporate update as the science advances and new datasets become available.

Requirements of the Peer Review:

1. The President's Office of Management and Budget (OMB) published a Peer Review Bulletin (December 2004) that requires online posting of this peer review, since NOAA's Acoustic Guidance has been determined to be "highly influential." To ensure that we

have a transparent process for public disclosure, names and affiliations of each peer reviewer is posted online, as well as all comments. We are required to identify peer reviewers by name and affiliation, but NMFS has the ability to post a compilation of reviewer comments. Therefore, we will not associate individual comments with a reviewer's name; rather we will compile the unabridged comments and organize by a review number. As an example, the previously submitted peer review report for NOAA's Acoustic Guidance is available at:

http://www.cio.noaa.gov/services_programs/prplans/ID43.html

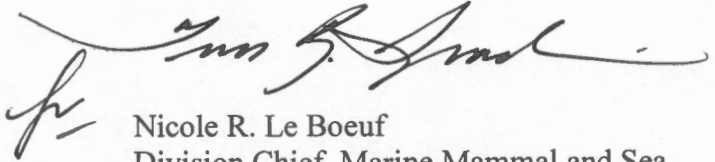
2. The Peer Review Bulletin further requires that non-Federal peer reviewers complete a "Confidential Conflict of Interest Disclosure" form. This form is attached, and we request that you complete this disclosure form and provide your curriculum vitae (CV) for our files as soon as possible. These tasks must be completed before the review begins to ensure there are no issues with you participating in this review. When completing the conflict of interest form, please consider and note any potential conflicts with both NMFS and Navy.
3. Notably, if NMFS receives a Freedom of Information Act (FOIA) request, anonymity of peer reviewers' comments cannot be guaranteed.
4. Finally, the Navy's technical report is distributed solely for the purpose of pre-dissemination peer review under applicable Information Quality Guidelines. It has not been formally disseminated by NOAA or the Navy. It does not represent or should be construed to represent agency (i.e., NOAA and/or Navy) policy. All information associated with this technical report is to remain strictly confidential until NOAA and/or Navy releases it to the public.

Logistics:

1. NMFS anticipates that the review to begin no later than the first week of March.
2. NMFS and Navy will hold an introductory teleconference for the peer reviewers, where NMFS will introduce the peer review charge and the Navy will provide an overview of their technical report. You will be contacted soon regarding your availability for this teleconference, if interested.
3. Please provide your comments to NMFS in electronic form. If there is something NMFS can do to help facilitate you providing comments, please let us know.
4. Please forward your comments to NMFS by no later than **30 days after receipt of the Navy's technical report from NMFS**. Again, if you identify major concerns, we appreciate it if you let NMFS know as soon as possible.

Unfortunately, due to federal budget constraints, NMFS will not be able to compensate you for your time. Nevertheless, the NMFS Office of Protected Resources appreciates your time and effort in completing this review and would not be able to produce a scientifically robust acoustic guidance document without your valuable input. If there are technical questions, please feel free to contact Amy Scholik-Schlomer, at (301) 427-8449 (Amy.Scholik@noaa.gov), who will serve as the liaison between NMFS and the Navy's subject matter experts. Questions on the overall acoustic guidance process can be directed to me at (301) 427-8402 (Nicole.Leboeuf@noaa.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Nicole R. Le Boeuf". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Nicole R. Le Boeuf
Division Chief, Marine Mammal and Sea
Turtle Conservation Division
NMFS Office of Protected Resources

Attachment:

Conflict of Interest Form