

**Book Chapter Published by ERDC Environmental Laboratory (ERDC-EL), and the USACE Alaska District (POA) Demonstrates a Risk Assessment Approach for Dredging Sounds**

*Impact statement: ERDC-EL published a book chapter in 'The Effects of Noise on Aquatic Life: Principles and Practical Consideration' outlining an approach to evaluate dredging sound risks to aquatic life.*

Dr. Andrew McQueen and Dr. Burton Suedel of the ERDC Environmental Laboratory (EL) Environmental Risk Assessment Branch (EPR) partnered with the USACE Alaska District (POA) (POC Matthew Ferguson), the Netherlands Organization for Applied Scientific Research, and the New Danish Research Center to demonstrate the use of a risk-based framework for evaluating dredging sounds in Anchorage Harbor, Alaska. Researchers and regulators around the world are focusing more on the potential risks of human-made sounds in marine ecosystems. However, the ecological consequences of these changing underwater soundscapes remain largely unknown. The marine coastline is particularly vulnerable, due to the intensity and overlap of human activities (e.g., dredging and construction, Figure 1) within critical nearshore habitats. Therefore, the development and application of risk-based tools are important to inform management of dredging projects in these complex marine ecosystems.

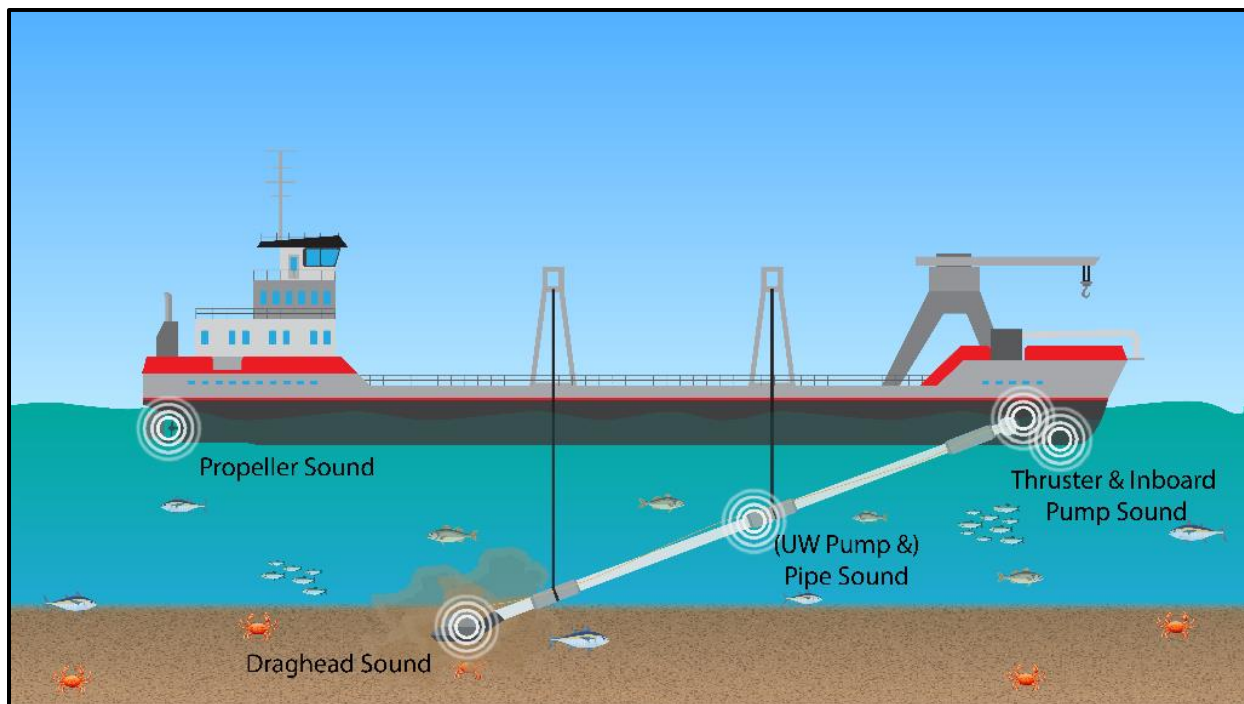


Figure 1. Diagram of potential sound sources from a hopper dredge.

The book chapter titled 'Environmental Risk Assessment Framework for Dredging Sounds' published in *The Effects of Noise on Aquatic Life: Principles and Practical Considerations* demonstrated a tiered ecological risk process using a dredging project in the Port of Alaska, which is near the confluence of the Knik Arm and Turnagain Arm of Cook Inlet and overlaps with sensitive marine mammal and fish habitat with a special emphasis on Beluga Whales

(Figure 2). This tiered and iterative framework allows a transparent and repeatable process for evaluating and communicating ecological risks to efficiently reach actionable risk management decisions with stakeholders and regulators.

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POC: Andrew McQueen [andrew.d.mcqueen@usace.army.mil](mailto:andrew.d.mcqueen@usace.army.mil)

- McQueen, A. D., B. C. Suedel, M. W. Ferguson, C. de Jong, and F. Thomsen. (2023). Environmental Risk Assessment Framework for Dredging Sounds. In: Popper, A.N., J. Sisneros, A. D. Hawkins, and F. Thomsen. (editors): “The Effects of Noise on Aquatic Life”. Springer, Cham. [https://doi.org/10.1007/978-3-031-10417-6\\_106-1](https://doi.org/10.1007/978-3-031-10417-6_106-1)

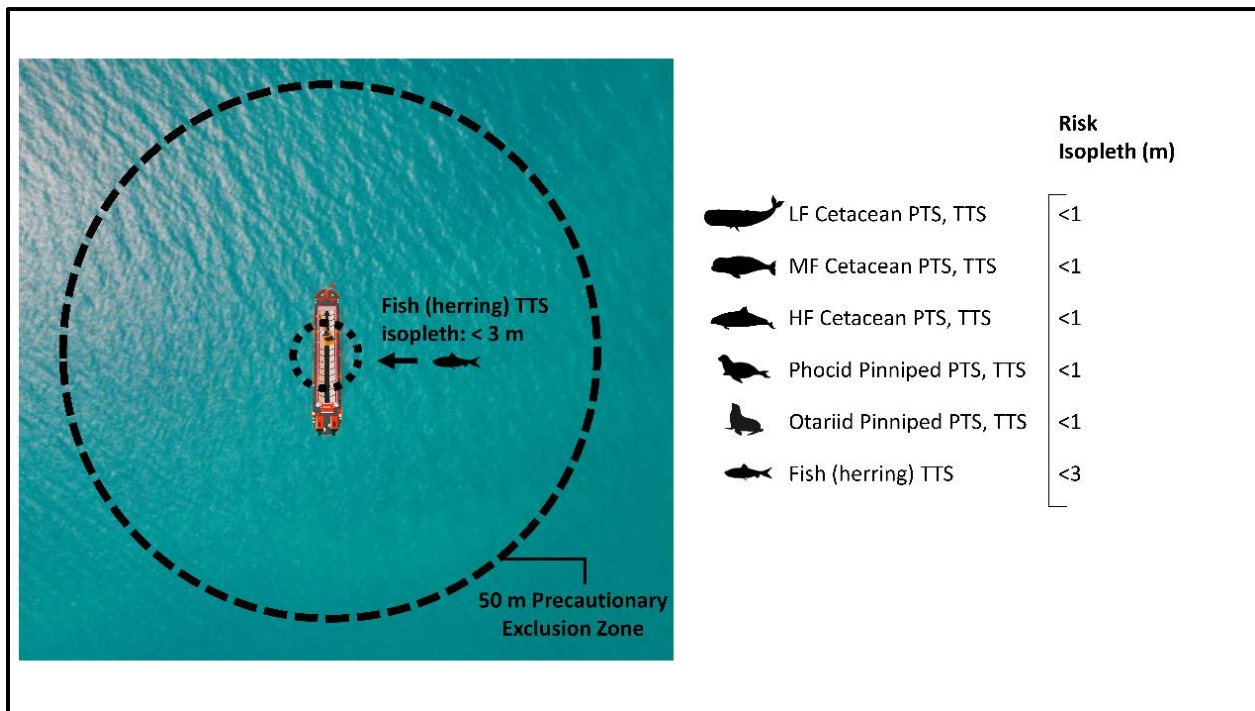


Figure 2. Hearing impairment response isopleths for species of concern based on maximum sound levels (168 dB re 1  $\mu$ Pa) from a hopper dredge in the screening assessment. PTS = permanent threshold shift; TTS = temporary threshold shift; LF = low frequency; MF = mid-frequency; HF = high frequency.