

Lull in Ship Noise After Sept. 11 Attacks Eased Stress On Right Whales

ScienceDaily (Feb. 8, 2012) — A new study, just published in the peer-reviewed *Proceedings of the Royal Society B*, offer the first evidence that exposure to low-frequency ship noise may be associated with chronic stress in whales.

The study, conducted in Canada's Bay of Fundy, has implications for all baleen whales in areas with heavy ship traffic, and for the recovery of the endangered North Atlantic right whale population.

By analyzing underwater noise levels during a period of reduced ship traffic in the bay following the terrorist attacks of September 11, 2001, and the comparing those data with levels of stress-related hormone metabolites in the fecal samples of right whales before and after the attacks, the researchers were able to show a strong correlation.

"Essentially, the animals' stress levels dropped when the underwater ship noises did," says Douglas P. Nowacek, Repass-Rodgers University Associate Professor of Marine Conservation Technology and Electrical & Computer Engineering at Duke University.

"There was a six-decibel decrease in underwater noise in the bay following 9/11, with an especially significant reduction in the low-frequency ranges below 150 hertz. This correlated to reduced baseline levels of stress-related hormone metabolites in samples collected from whales later that fall," he explains. "In subsequent years, ship traffic -- and noise -- were higher, along with the whale's stress-hormone levels."

Over the past 50 years, scientists have become increasingly concerned about the effects growing underwater noise pollution from human activities is having on whales and other marine animals that rely on sound to communicate, locate prey and navigate, Nowacek explains.

Particularly concerning, he says, are the sounds made by large ships, whose propellers and engines generate low-frequency noise that overlaps the frequency band used by baleen whales for communication. These low frequencies travel very well through the ocean.



Right whale. Exposure to low-frequency ship noise may be associated with chronic stress in whales. (Credit: © JOETEX1 / Fotolia)

Past responses of whales to this increased noise have included habitat displacement, behavioral changes, and alterations in the intensity, frequency and intervals of their calls. But until this study, there was little evidence about whether exposure to the noise also resulted in physiological responses that could be harmful to the whales.

Nowacek, who holds joint appointments at Duke's Nicholas School of the Environment and Pratt School of Engineering, is one of eight authors of the new study. Rosalind M. Rolland of the New England Aquarium is lead author. Other authors are Susan E. Parks of Pennsylvania State University; Kathleen E. Hunt and Scott D. Krauss of the New England Aquarium; Manuel Castellote of the NOAA's Atmospheric Administration's Alaska Fisheries Science Center; Peter J. Corkeron of the Cornell Lab of Ornithology; and Samuel K. Wasser of the University of Washington.

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