ACOUSTICS2008/3399
Monitoring, measuring and describing ocean noise over ecologically viable scales with applications to impacts on large whales

Christopher Clark, Chris Tremblay, Melissa Fowler, Christi Diamond, Dimitri Ponirakis, Clara McCarthy, Janelle Morano, Charles Muirhead, Anita Murray, Liz Rowland, Catherine Vannicola and Ann Warde
Cornell University Laboratory of Ornithology, Bioacoustics Research Program, 159 Sapsucker Woods Road, Ithaca, NY 14850, USA

Large whales communicate primarily in the low ($<$ 1000Hz) frequency bands; the same frequency range within which anthropogenic ocean noise has been increasing over the last half century at approximately 3-5 dB/decade. The working assumption and hypothesis hold that rising ambient noise levels negatively impact whales by interfering with communication, navigation and predator detection, and that over the long-term such effects could reduce breeding success and population size. There is a lack of empirical data on the spatial-temporal dynamics of ambient noise by which to assess potential impacts. One year of continuous acoustic data from an ongoing distributed array of 19 continuous seafloor recorders covering a 1000 km2 area in Massachusetts Bay, USA were analyzed for ambient noise statistics and the occurrences, locations and vocal behaviors of fin, humpback and right whales. Noise levels were greater than 120 dB rms re 1 μPa in the 10-1000Hz band throughout the 1000 km2 area for $\geq$ 50% of the season when whales were present. If animals are relying on acoustic cues to coordinate feeding and social interactions, these high noise levels impose a significant loss of acoustic habitat during the whales' residency in the area.