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Correcting gray whale (Eschrichtius robustus) call rates in San Ignacio Lagoon, using sound exposure level measurements of ambient noise

Melania Guerra[a], Aaron Thode[a], Jorge Urban[b] and Sergio Gonzalez[b]
[a]Marine Physical Laboratory, Scripps Institution of Oceanography, 9500 Gilman Dr, MC 0238, La Jolla, CA 92093-0238, USA
[b]Laboratorio de Mamiferos Marinos, Universidad Autonoma de Baja California Sur, La Paz, Apartado Postal 19-B, 23080 La Paz, Mexico

Autonomous acoustic recordings of gray whales (Eschrichtius robustus) were made in San Ignacio Lagoon, in February 2005-2008, while animals were present to breed and raise calves. Counts were made of the gray whales' most common vocalization, type S1. A sequence of semi-automated procedures was implemented to assist with call detection. Hourly call rates were computed for all seasons and adjusted for expected changes in detection range, caused by variations in the ambient background noise level. In this environment, the underwater acoustic background combines biological, oceanographic and man-made sources and can present changes of 10dB above the average base level of 96dB re 1uPaˆ 2-sec between 350 and 750 Hz over semi-diurnal scales. The relative changes in call rates in 2006 and 2008 are compared with visual survey counts conducted over the same period.The definition of SNR in the present study develops from energy flux densities or sound exposure levels (SEL). SEL were calculated experimentally through even sampling in time and individual sampling for each call. By assuming that the background masks a proportion of the detected calls, corrections were applied to determine the vocal activity within a fixed detection range.