
A treasure from the past: Modelling former sperm whale distribution with historical whaling data

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Knowledge on the presence and habitat preference of cetaceans is important for conservation management in Indonesia. However, the records of current species occurrence covering all the country's waters are lacking. A potential treasure trove in terms of whale presence is historical whaling data for sperm whale (data from 1761-1920, Charles Haskins Townsend). Sperm whale is one of the most important species, and ubiquitous around equatorial Indonesia. A critical gap, however, is information about whale distribution, as historic data only depicts whaling points. First, we linked sperm whale historical whaling data to nine submerged topographic variables (bathymetry, slope, distance to- coast, -1000 m & -5000 m isobaths, seamount, shelf, trench, and trough) to determine habitat preference of sperm whale. Then, this relation was projected onto the study area. Both steps were performed using habitat models, Maxent and Generalized Additive Model (GAM), providing whale distribution over seasons. Our results showed that Maxent predicted a wider area of distribution than GAM, and its distributions agreed best with the historical whaling data. Four areas in the eastern Indonesia were always identified as important habitats for sperm whales at any season, while in some locations at certain seasons, sperm whales did not occur. Conservation management e.g. marine protected areas and marine spatial planning in Indonesia should take into account this seasonal variability. Modern habitat models applied to historical whaling data can unveil historical sperm whale distribution and its seasonal differences. Our information can provide a baseline to assess present sperm whale distribution, prioritise current research and monitoring (future data collection), and contribute with recommendations to marine mammal conservation management in Indonesia.