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EMPIRICAL BAYES ESTIMATES OF POPULATION SIZE OF HUMPBACK WHALES BREEDING OFF ABROLHOS BANK, BRAZIL

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Photoidentification studies have been carried on since 1988 at Abrolhos Bank, Bahia, Brazil. Using natural marks to individually identify the humpback whales (*Megaptera novaeangliae*) we applied mark-recapture data to estimate the number N of individuals in a closed population, in year 1996. Due to low resightings rates, a bayesian approach was used instead. They assume that, given N , the number of times the i -th individual is observed in interval $(0,t)$, denoted $X_i(t)$, is a Poisson process with parameter λ_i and that the processes are independent among individuals. The model assumes random variation in the catchability. The full data set is $\mathcal{D} = \{ f_1 = 96, f_2 = 6, f_3 = 1, f_4 = 1 \}$ for an observation time of $t = 573$ hours during the whole season. Hence, $j_{\max} = 4$, $m = 115$ (total number of observations) and $s = 104$ (total number of distinct animals), resulting in the maximum likelihood estimate $\phi_{mle} = 0.0957$. The 90% highest posterior density estimates HPD(90%) is the interval [928, 1265]. Some suppositions of the model might limit its range of potencial applications. First, each animal is assumed to remain with the same catchability (fixed λ) during the whole sampling period. And second, heterogeneity among individuals is random and follows a specified probabilistic model $g(\lambda|\Theta)$; that is, the model is unable to provide for non-random pattern in the heterogeneity among individuals. To adress the first supposition, the sampling period should be kept as short as possible, while the second one suggest stratified sampling which is not an easy task concerning large cetaceans. We see simulation studies on the robustness of the suggested model as the obvious way to proceed the study.