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Individual heterogeneity and identifiability in estimation of brown bear population size in Sweden

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Abstract

In this thesis we investigate the estimation of the Swedish brown bear population. Especially, we look into whether problems connected to individual heterogeneity and identifiability occur for the Swedish brown bear monitoring program. In former studies it has been argued that problems connected to these things are a general problem for wildlife studies. In this thesis, based on the Swedish brown bear population we look into these kinds of problems. We fit different statistical models of individual heterogeneity to the data from the monitoring program and check whether these models provide a good fit and whether they can be distinguished.

We find that problems related to individual heterogeneity do indeed occur in the Swedish brown bear program. Several statistical models can be fit well to data but the models estimation of the population size varies a lot. This makes the estimation difficult since it is not clear which model is the optimal one to use for the estimation. This means that even though a good fit have been find you cannot know for sure that the estimate provided by that model is a good estimate. The choice of the model and method will matter a lot for the final estimate but there is no clear way to distinguish these models. Furthermore, we compare the different statistical models and find some general information of what to expect from them when using them for this kind of estimation.

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