The effect of model selection on point transect density estimation

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Abstract: Many simulations have been done for testing the properties and robustness of distance sampling estimators. When data is generated from a particular model and fitted using the same model they seem to perform well. However, in a real life situations the true model is unknown. Therefore, the standard methods for fitting detection functions to distance sampling data (as described by Buckland *et al.* 2001) involve selecting among several classes of semi-parametric models, and it is recommended that this selection is performed using standard model selection techniques such as AIC.
Here, we check the performance of distance sampling estimators when data was analysed using model selection, comparing line and point transect estimators in a reasonable number of scenarios. As has been shown, point transect estimation is more difficult and model selection more critical, since the fit of the model to the distance data near the line or point is the most important and in point transects fewer distances are recorded. Initial results from our simulation study show that, point transect sampling can be highly biased (>30%) if the sample size is under the 75-100 observations recommended (Buckland *et al.* 2001). Moreover, under realistic circumstances and an adequate sample size, in some situations we still find around 10% bias, unless the sample size is very high.

References

Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. (2001). Introduction to Distance Sampling: Estimating Abundance of Biological Populations. *Oxford University Press*, Oxford, UK.