How Robust to model uncertainty are optimal investment plans?

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Abstract

This paper looks at the impact of uncertainty over the choice of parameters in the biodiversity reserve site selection analyses based on the species-area curve ecological model. The impact of uncertainty is estimated on the allocation of resources within and towards conservation budgets using a simulation model. Using this model, the impact of uncertainty is estimated by finding the optimal allocation of land for protected areas under different conditions. Firstly, homogeneous land costs are assumed to look at the effect of uncertainty when the allocation decision is determined by species richness. Secondly, the model is extended to include fixed heterogeneous land costs in order to look at the effect of uncertainty when opportunity costs are included. Finally, the model is extended to include land costs as a function of land supply in order to get a more accurate estimation of the impact of uncertainty on land allocation. The paper finds that, within the Australian context, uncertainty over the ecological model has little impact on the cost-effective allocation of resources within conservation budgets, but can have significant impact on the efficient allocation of total resources towards conservation budgets.