Uncertainty analysis in the modeling of wildlife corridors

Lara Nunes[a], Ana Luisa Gomes[a], Alexandra Fonseca[a]

[a]Direção Geral do Território (DGT) (Portugal)

Uncertainty analysis tends to be ignored or disregarded in landscape management by the researchers or environmental decision makers (Hou *et al*., 2013), namely in connectivity modeling maps (Zeller *et al*., 2012). Wu (2013) revised uncertainty analysis as part of the top 10 list of key issues and research priorities in landscape ecology. Uncertainty is introduced in the model results by many ways including through observation error, inaccuracies of distribution modeling, ecological succession, land-use changes and climate change (Moilanen *et al*., 2006), assumptions and algorithm selection (Beier *et al*., 2009). On the other hand, stakeholder discomfort with a poorly defined or justified model can result in objections to the entire approach (Beier *et al*., 2009).

In this work, through a simple uncertainty analysis, we evaluate the robustness of a multicriteria expert system for decision support in identifying lower environmental disturbance corridors for wildlife. The extent to which the uncertainty in the weights of the factors and values of classes of each factor affected the results was examined, considering in particular: i) the location of the corridor, ii) the resistance to the movement/progression iii) the cost-distance. Six proposed corridors generated from the model were compared with corridors generated from four alternative scenarios. The geographic model has shown to be robust, with a high overlap average (79%) and an increase in resistance and cost-distances very close to zero, 0.5% and 0.3% respectively. Lastly, model assumptions were debated.

We consider the uncertainty analysis of multicriteria expert systems essential to promote decision-makers awareness on the potential impact of model uncertainty when applying these models in strategic decisions on conservation planning.

Keywords

Conservation Planning; Decision Support Systems; Best Practices.

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