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RESEARCH ARTICLE

Thinking outside the patch: a multi-species comparison of conceptual models from real-world landscapes

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Abstract

Context When modeling a species' distribution, landscapes can alternatively be conceptualized following patch- or gradient-based approaches. However, choosing the most suitable conceptualization is difficult and methods for empirical validation are still lacking.

Objectives To address the conditions under which a given conceptual model is more suitable, taking into account landscape context and species trait dependency effects. Patch- and gradient-based conceptualizations were built based on two structurally different landscapes: variegated and mosaic. We hypothesize that: (H1) gradient-based models better describe variegated landscapes while patch-based models perform better in mosaic landscapes; and (H2) gradient-based models will fit generalist species better while patch-based models will suit specialists better.

Methods We modeled the distribution of eleven bird species in each landscape using each conceptualization. We determined the suitability of each conceptual model to fit statistical models by looking for cross-species responses and deviations from best models.

Results We found no clear support for our hypotheses. Although patch-based models performed better in mosaic landscapes (H1), they also provided useful

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Data availability statement The datasets during and/or analyzed during the current study are available from the corresponding author on request.

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