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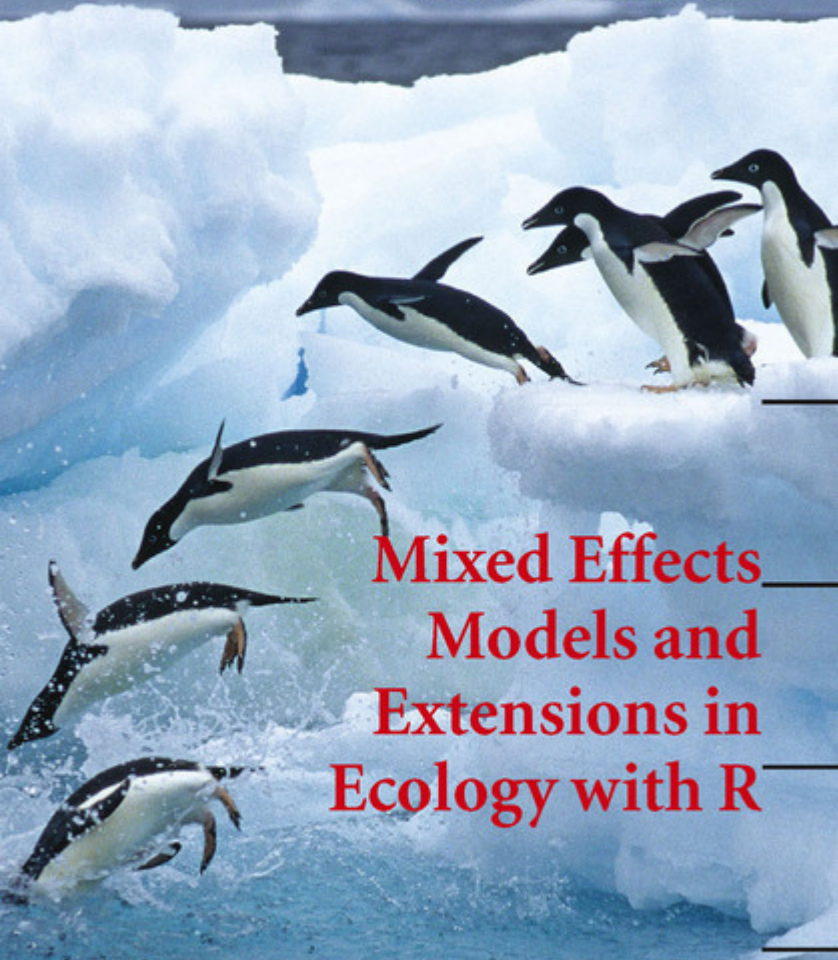

# Mixed Effects Models and Extensions in Ecology with R

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*To my parents who, even now, continue to support me in everything I do – Graham M. Smith*

# Preface

No sooner, it seems, had our first book *Analysing Ecological Data* gone to print, than we embarked on the writing of the nearly 600 page text you are now holding. This proved to be a labour of love of sorts – we felt that there were certain issues sufficiently common in the analysis of ecological data that merited more detailed description and analysis. Thus the present book can be seen as a 'sequel' to *Analysing Ecological Data* but with much greater emphasis on these very issues so commonly encountered in the collection of, and analysis of, ecological data. In particular, we look at different ways of analysing nested data, heterogeneity of variance, spatial and temporal correlation, and zero-inflated data.

The original plan was to write a text of about 350 pages, but to do justice to the sheer range of problems and ideas we have well exceeded that original target (as you can see!). Such is the scope of applied statistics in ecology. In particular, partly on the back of reviewer's comments, we have included a chapter on Bayesian Monte-Carlo Markov-Chain applications in generalized linear modelling. We hope this serves as an informative introduction (but no more than an introduction!) to this interesting and increasingly relevant area of statistics.

We received lots of positive feedback on the approach and style we used in *Analysing Ecological Data*, especially the combination of case studies and a theory section. We have therefore followed the same approach with this book. This time, however, we have provided the R code used for the analysis. Most of this R code is included in the text, but where the code was particularly long, it is only available from the book's website at www.highstat.com. In the case studies, we also included advice on what to write in a paper.

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Gloucester, United Kingdom — Neil J. Walker
Kazan, Russia — Anatoly A. Saveliev
Bath, United Kingdom — Graham M. Smith
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The most difficult part of writing a book is finding public domain data which can be used in theory chapters. We are particularly thankful to the following persons for donating data sets. Sonia Mendes and Graham Pierce for the whale data, Gerard Janssen for the benthic data, Pam Sikkink for the grassland data, Graham Pierce and Jennifer Smith for the squid data, Alexandre Roulin for the barn owl data, Michael Reed and Chris Elphick for the Hawaiian bird data, Tatiana Rogova for the Volzhsko-Kamsky forestry data, Robert Cruikshanks, Mary Kelly-Quinn and John O'Halloran for the Irish (sodium dominance index) river data, Chris Elphick for the sparrow and California bird data, Michael Penston for the sea lice data, Joaquín Vicente and Christian Gortázar for the wild boar and deer data, Ken Mackenzie for the cod data, and António Mira for the snake data. The proper references are given in the text. We also would like to thank all people involved in the case study chapters; they are credited where relevant.

Michelle Cronin provided the seal photo on the back cover, Joaquin Vicente the deer photo, and Malena Sabatino gave us the bee photo. The photograph of the koalas was provided by Australian Koala Foundation (www.savethekoala.com). The photo on the front cover is from © Wayne Lynch/Arcticphoto.com.

Finally, we would like to thank John Kimmel for giving us the opportunity to write this book and for patiently accepting the 6-month delay. Up to the next book.

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