

## BAYESIAN APPLICATIONS IN APPLIED ECOLOGY

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Applied ecology attempts to answer ecological questions that are of practical relevance to policy-making and decision making. These questions can often only be linked to data in indirect and relatively complex ways, and they will often require the synthesis of evidence from a number of different data sources, and Bayesian approaches are therefore attractive. I will illustrate the challenges, and some potential solutions, using four distinct case studies - these relate to projects that I have worked on, and they each illustrate different situations in which Bayesian approaches can be valuable.

The first case study involves modelling the spread of an invasive species (giant hogweed) over space and time, and illustrates the use of Bayesian methods to draw inferences about models that would be difficult to fit in a non-Bayesian way. The second case study involves modelling the spatial distribution of British plant species in relation to net primary productivity, and illustrates a situation in which a statistical model is being used to link a number of disparate datasets - and in which it is therefore important that uncertainty is propagated correctly. The third case study concerns the modelling of trends in a species whose populations can fluctuate very rapidly (midges), and illustrates a situation in which informative priors can be used to constrain uncertainty. The final case study involves quantifying the uptake of agricultural practice associated with climate change mitigation, and illustrates a situation in which expert elicitation can be used to elicit informative priors.