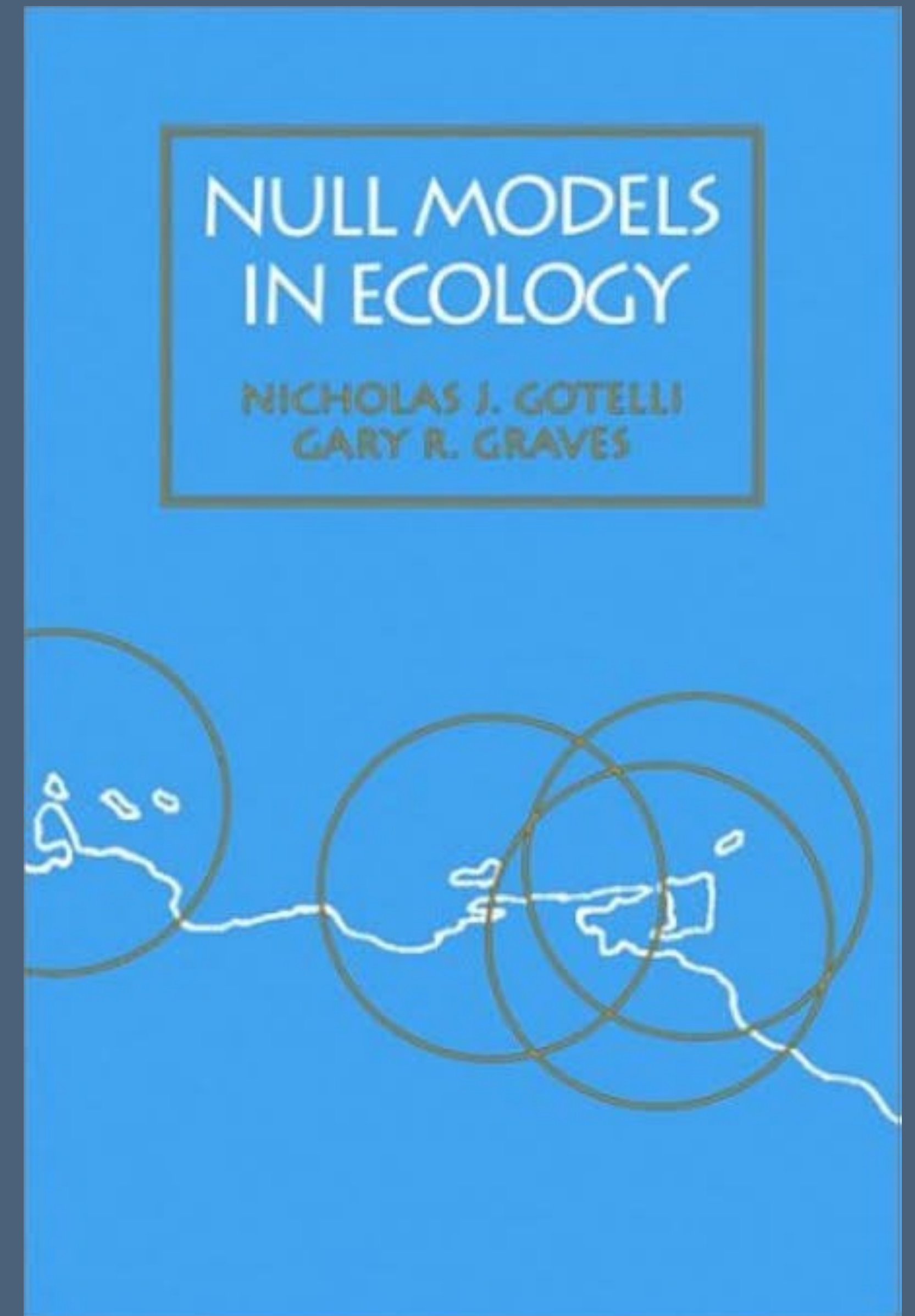


Null models in Ecology

- Using null models to create robust inference
- Maintains some constraint from observed data (species richness, abundance distributions, ...)
- Custom-build for specific ecological questions
- Goes beyond the basic null hypothesis testing by creating a baseline expectation that is data-driven



Null and neutral are different



FORUM is a lighter channel of communication between readers and contributors; it aims to stimulate discussion and debate, particularly by presenting new ideas and by suggesting alternative interpretations to the more formal research papers published in *ECOGRAPHY* and elsewhere. A lighter prose is encouraged and no summary is required. Contributions should be concise and to the point, with a relatively short bibliography. Formal research papers, however short, will not be considered.

Null versus neutral models: what's the difference?

N. J. Gotelli, (ngotelli@uvm.edu), Dept of Biology, Univ. of Vermont, Burlington, VT 05405, USA. – Brian J. McGill, Dept of Biology, McGill Univ., Stewart Biology Bldg, 1205 Dr. Penfield Ave., Montreal, QC H3A 1B1, Canada

The neutral model posits that random variation in extinction and speciation events, coupled with limited dispersal, can account for many community properties, including the relative abundance distribution. There are important analogies between this model in ecology and a three-tiered hierarchy of models in evolution (Hardy Weinburg, drift, drift and selection). Because it invokes random processes and is used in statistical tests of empirical data, the neutral model can be interpreted as a specialized form of a null model. However, the application and interpretation of neutral models differs from that of standard null models in three important ways: 1) whereas most null models incorporate species-level constraints that are often associated with niche differences, the neutral model assumes that all species are functionally equivalent. 2) Null models are usually fit with constraints that are measured directly from the data set itself. In contrast, the neutral model requires parameters for speciation, extinction, and migration rates that are almost never measured directly, so their

might be viewed as a mechanism that contributes to pattern along with other processes. Alternatively, the fit of data to the neutral model can be compared to the fit to other process-based models that are not based on neutrality assumptions. Finally, the neutral model can also be tested directly if its parameters can be estimated independently of the test data. However, these approaches may require more data than are often available. For these reasons, simple null model tests will continue to be important in the evaluation of the neutral model.

The neutral model (Bell 2000, Hubbell 2001) has generated great interest and controversy among ecologists. Some of these debates echo earlier controversies in the 1980s over null model analysis (Gotelli and Graves 1996). Indeed, Enquist et al. (2002) have claimed that the