

White, E.R. and A.T. Smith. 2018. The role of spatial structure in the collapse of regional metapopulations. *Ecology*.

Corresponding author: eastonrwhite@gmail.com

Corresponding R scripts and data can be found at <https://github.com/erwhite1/BodiePikaMetapop>

Appendix S3 Parsing out the effects of spatial structure and patch heterogeneity

Spatial structure and patch size are both important components of metapopulation dynamics (Smith and Gilpin 1997). At Bodie, patch size is the potential number of territories on each patch. For most of our simulations, we examine models with the actual Bodie spatial structure and the heterogeneity in number of territories per patch. However, it is also interesting to examine model outcomes when we relax these assumptions. Therefore, with a 2x2 full factorial design we examined the importance of these two assumptions: (1) no spatial structure (global dispersal, all patches are equally connected) and homogeneous patches (same number of territories per patch); (2) Bodie's spatial structure and homogeneous patches; (3) no spatial structure and heterogeneous patches; and (4) the actual Bodie spatial structure and heterogeneity in patches. We then made the same six measurements (e.g. patch occupancy) of these different models as we did in the rest of the paper.

Table S1: Model outputs for four different scenarios of possible Bodie spatial structure and patch heterogeneity as compared to field data.

	Mean pop. size	Variance	Patch occupancy	Collapse year
Field Data	87.43	819.56	0.38	1991.00
Bodie structure + heterogeneity	92.62	379.30	0.32	2005.29
Bodie structure + homogeneity	98.31	800.78	0.44	2049.07
No spatial structure + heterogeneity	100.11	351.43	0.41	2047.09
No spatial structure + homogeneity	103.58	780.06	0.47	2066.41

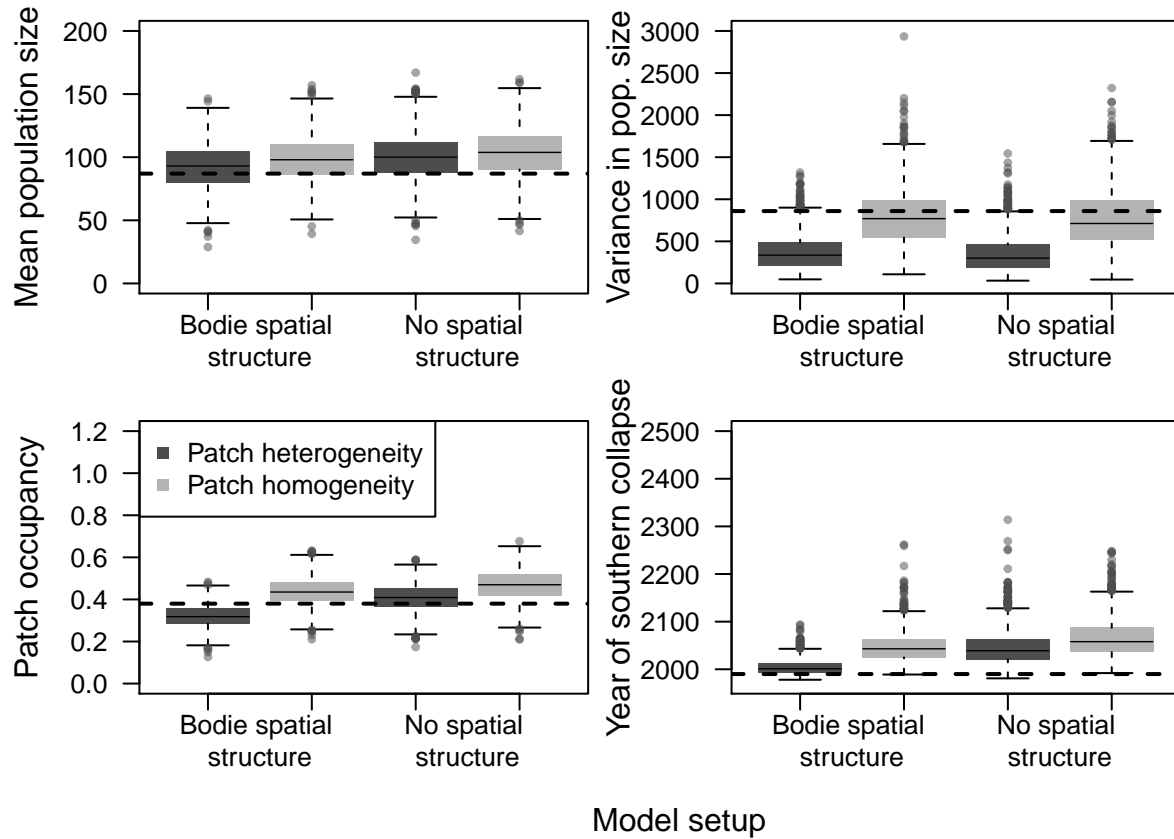


Figure S1: Comparison of four different simulation scenarios representing combinations of different spatial patterns and patch heterogeneities. The dashed horizontal line on each patch represents the actual measured value from the field. 1000 trials were run for each treatment. The legend applies to all four panels.

References

Smith, A. T., and M. Gilpin. 1997. Spatially correlated dynamics in a pika metapopulation. Pages 407–423 in *Metapopulation biology: Ecology, genetics, and evolution*. Academic Press, London, UK.