

## Species interactions do not have a strong effect on long-term community dynamics in a changing environment.

Elizabeth Porzig  
eporzig@pointblue.org

The degree to which interactions between species, like competition for food, affect the distribution and abundance of wildlife has long been a cornerstone ecological question. Answering this question has proven difficult because we lack data that are sufficiently detailed and long-term. Today, this question has gained renewed relevancy in the face of climate change, as we are altering our environment in novel ways and thus need to be able to understand and forecast how species will be affected.

This study uses long-term data from the Palomarin Field Station in central coastal California – an area undergoing rapid vegetation succession – to investigate the role of species interactions in affecting long term trends in abundance. We studied the breeding densities of Anna’s Hummingbird, Bewick’s Wren, Orange-crowned Warbler, Song Sparrow, Spotted Towhee, White-crowned Sparrow, and Wrentit, with data on variation in rainfall and vegetation succession, to tease apart the

relative importance of within- and between- species interactions, and environmental change, in affecting the overall changes in populations. We found that environmental variation, including changes in vegetation and rainfall was the most important driver of population change at Palomarin, and that between-species interactions were of minor importance.

These results suggest that we can predict population trends for given species using projections of habitat and environment alone, and that including projections of other species will have minimal added benefit. An important caveat is that this study was conducted on species that have co-existed for millennia, and did not consider novel species assemblages, as are expected with climate change.

---

### Main Points

We used 29 years of long-term monitoring data from the Palomarin Field Station to understand the degree to which bird population densities are affected by the populations of other bird species breeding around them in a changing environment.

We found that between-species interactions are of minor importance for birds at Palomarin compared to other factors, including plant succession and within-species density dependence.

These results suggest that we can predict population trends using environmental attributes alone such as vegetation and climate.

---

Porzig, E.L., N.E. Seavy, J.M. Eadie, D.L. Humple, G.R. Geupel, and T. Gardali. 2016. Interspecific interactions, population variation, and environmental forcing in the context of the community. *Ecosphere* 7 (6).  
[http://www.prbo.org/refs/files/12400\\_ElizabethL.Porzig2016.pdf](http://www.prbo.org/refs/files/12400_ElizabethL.Porzig2016.pdf)