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Climate, Competition, and Cavity-nesters, oh my!

The Impact of Climate on the Breeding Success of Cavity-nesting Songbirds in California



Introduction

Background:

- Fluctuations in climate variables, such as temperature and precipitation, have the ability to negatively influence the breeding success of birds (Dreitz et al. 2012; Scholl and Hill 2020)

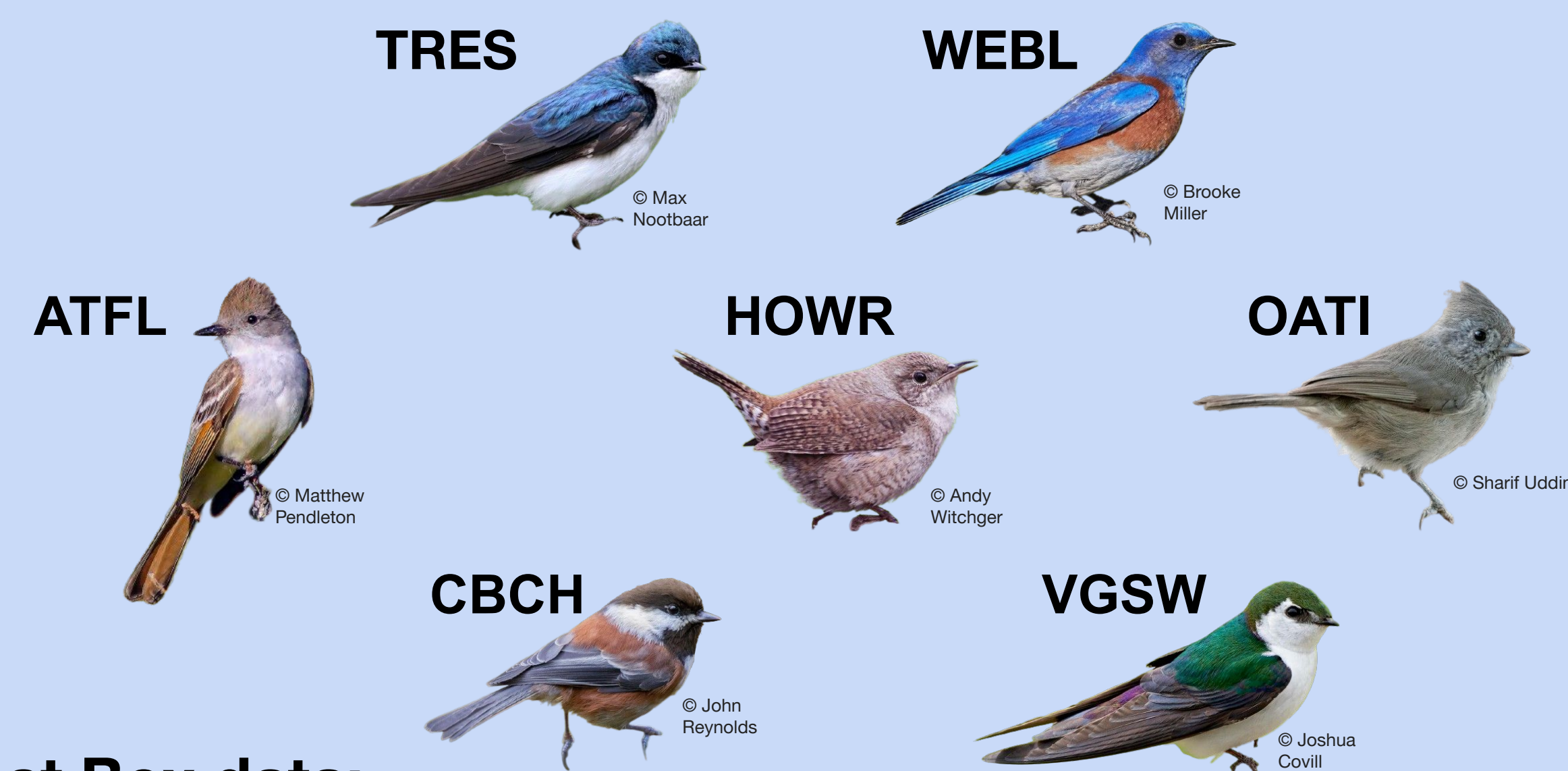
Question:

- How does climate change impact the breeding success of cavity-nesting songbirds?

Prediction:

- If climate change is impacting the breeding success of cavity-nesting songbirds, then I expect to see lower numbers of successful fledglings as temperature increases and precipitation decreases.

Methods



Nest Box data:

- California Bluebird Recovery Program (CBRP)
 - Number of fledglings per available nest box
 - Number of fledglings per nest attempt

Climate Data:

- National Oceanic Atmospheric Administration (NOAA) National Centers for Environmental Information
 - Average maximum daily temperature
 - Total breeding season precipitation
 - Total winter precipitation

Statistical Modeling:

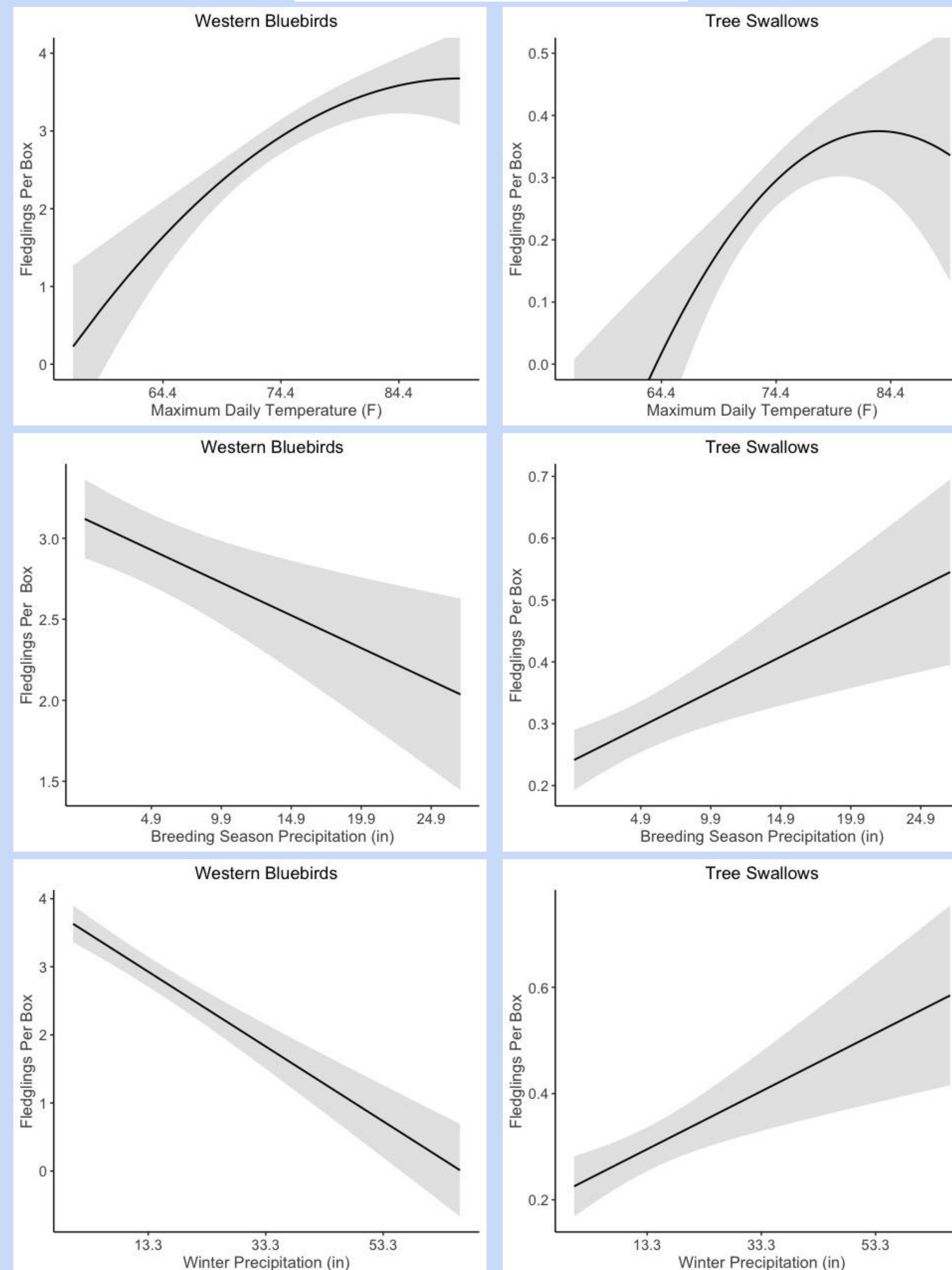
- Mixed linear model in R
 - Random effects included for year and individual nest box site

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Results



Acknowledgments

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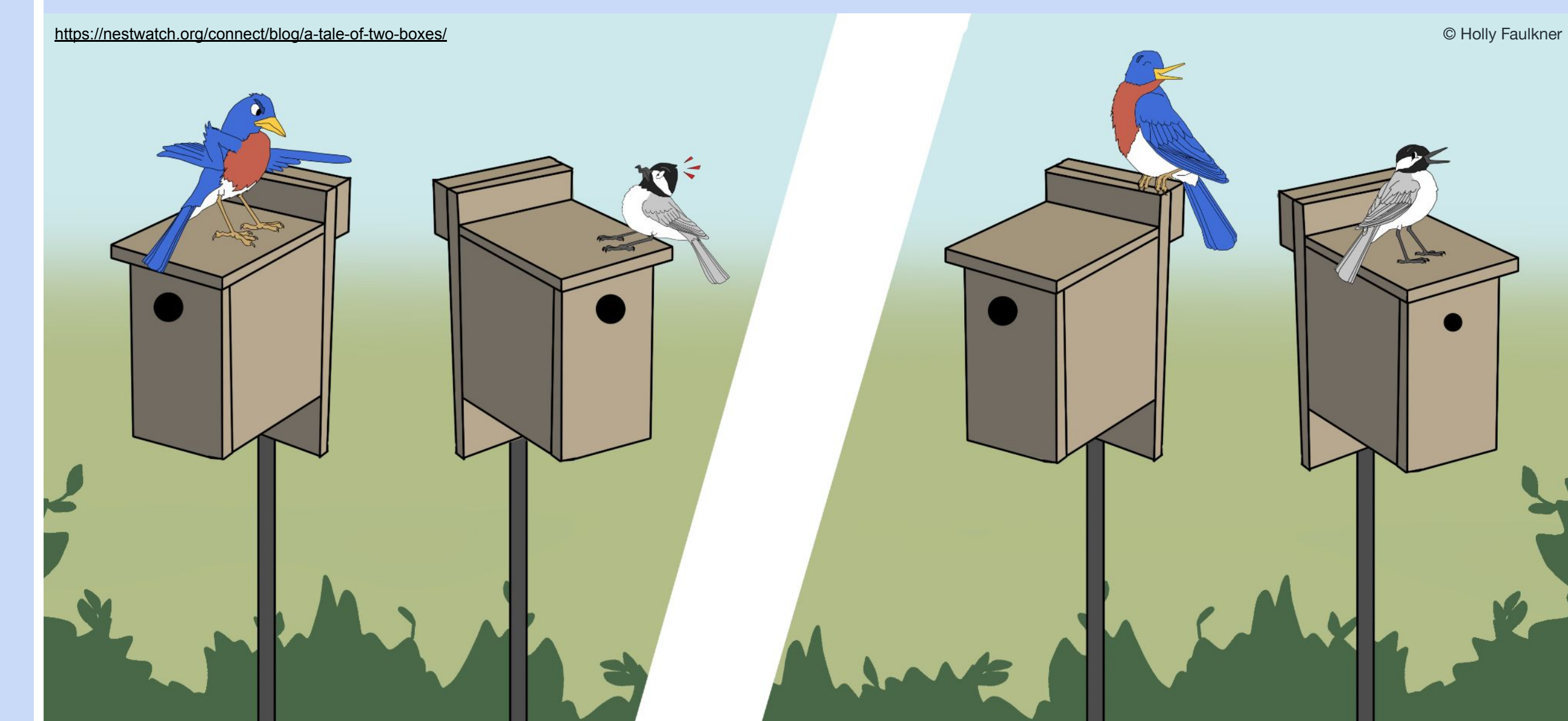
Discussion

Results:

- All species had some level of significance with the climate variables at the fledglings per box level.
- Only 2 species (VGSW, WEBL) had significant relationships with one climate variable (temperature) at the fledglings per nest level.

Discussion:

- This suggests that competition for nest box sites, rather than ability to produce offspring, is what's being impacted by periods of environmental stress.



Management Implications:

- Conservation of passerine species may require a greater number of available nest box sites or natural tree cavities for successful reproduction due to future projected climate change trends.

Literature Cited

Dreitz, V. J., R. Y. Conrey, and S. K. Skagen. 2012. Drought and cooler temperatures are associated with higher nest survival in mountain plovers. *Avian Conservation and Ecology* 7:1-13.

Scholl, E. M., and S. M. Hill. 2020. Heavy and persistent rainfall leads to brood reduction and nest failure in a passerine bird. *Journal of Avian Biology* 51:1-11.

Link to
Full Paper

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