



Bee abundance varies across a prairie and agricultural landscape from 2004-2019

Mia Stevens^{1,2}, Alex Carroll², Zach Portman¹, Stuart Wagenius²



Introduction

- Pollinator populations are declining worldwide, particularly bees¹
- Tallgrass prairie habitat is shrinking and being converted to agriculture²
- Insecticide and neonicotinoid use has increased since 2004³
- We do not know how bee communities are changing in western Minnesota
- Therefore, we collected bees from locations with different surroundings over four summers in rural Minnesota

Research questions

- Did some traps collect more bees than others?
- Is there variation in the number of bees caught over time, within and among years?

Methods



Traps were yellow bowls filled with soapy water, at randomly chosen locations

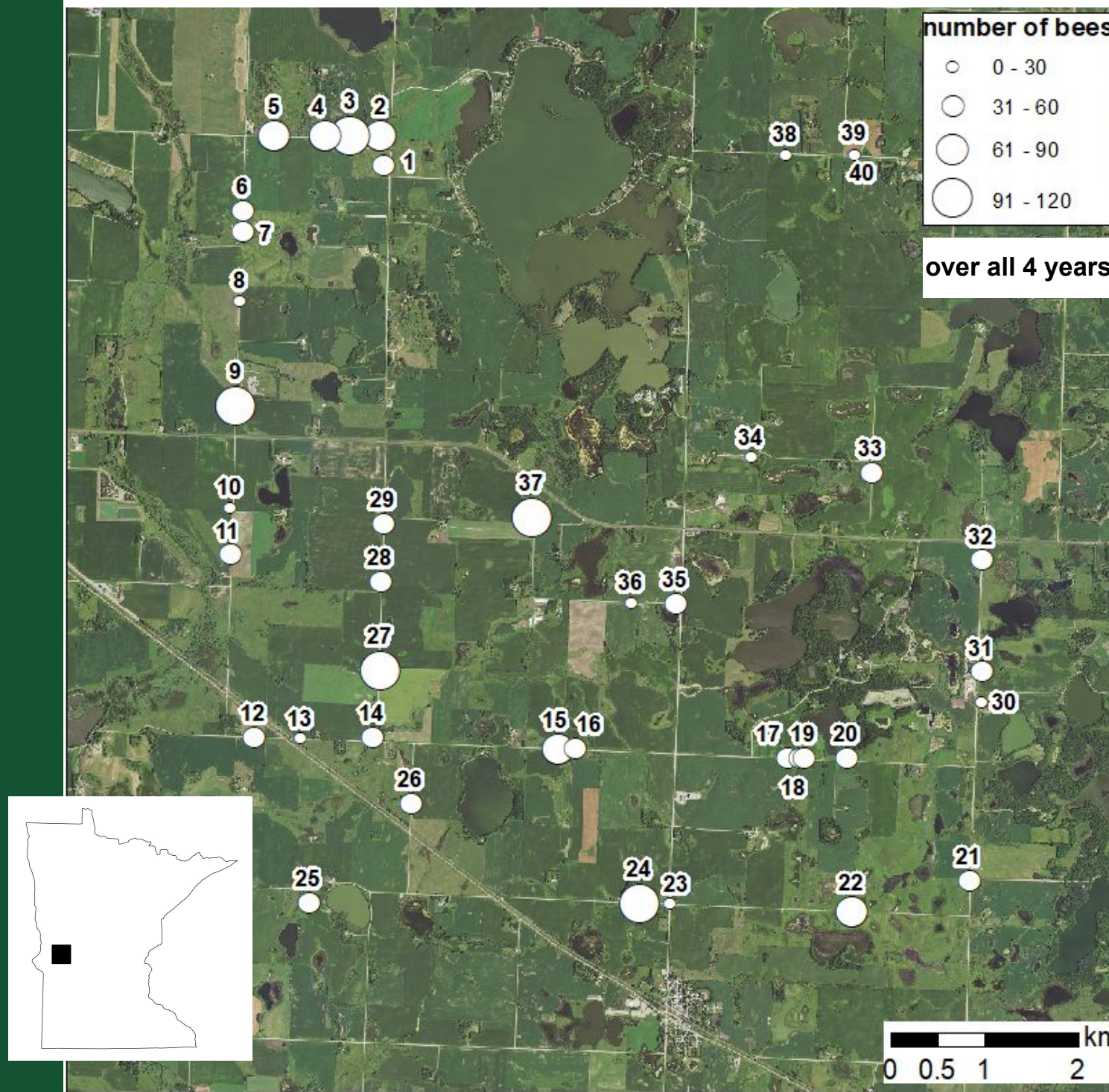


Set out traps for a day, 6-7 times a year in 4 summers (2004, 2017-2019)

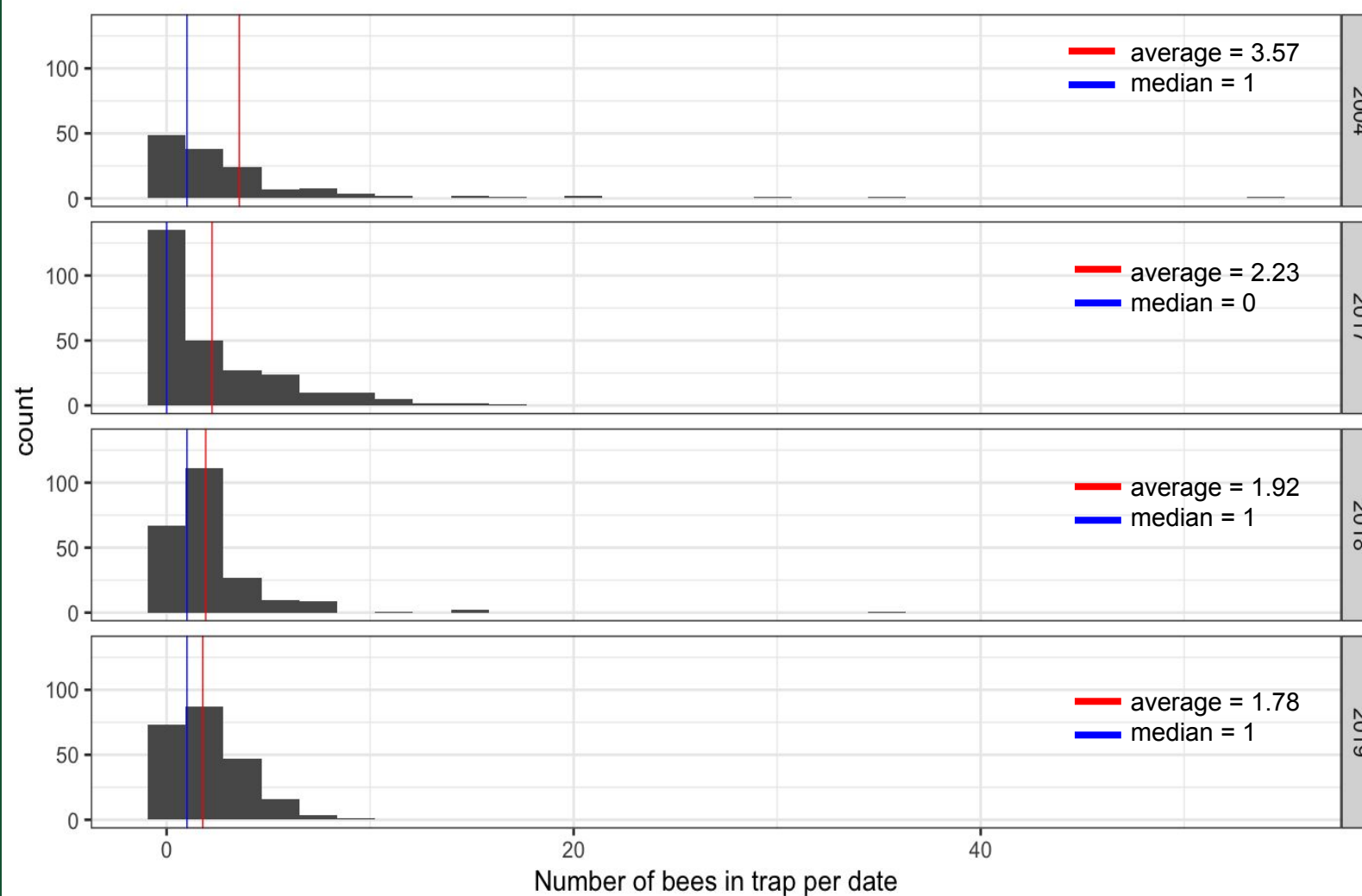


Pinned and identified bees

Total number of bees per trap varied across the landscape



Number of bees per trap per year decreased slightly



Results

- Per trap capture rates ranged from 0-89%
- Average number of bees caught per day decreased over time
- 2004 had the highest average (3.57 bees/day) and 2019 had the lowest (1.78 bees/day)

Year	Traps	Bees
2004	20	551
2017	40	594
2018	37	438
2019	38	405
total		1,988

Discussion

- Now that we know bee abundance varies over time and space, we will investigate our big research questions:
- How have bee abundance and species richness changed over time?
- Does the amount of agricultural land and grassland influence the nearby bee community?

Next steps

- Diversity analysis: investigate differences in bee species diversity over the years and between traps
- Landscape analysis: characterize land use surrounding each trap each year using GIS
- Combined analysis: learn how much the amount of agricultural land and grassland corresponds to the nearby bee community

Acknowledgments

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Citations

- ¹ Steffan-Dewenter *et al.* (2002). *Ecology*
- ² Hoekstra *et al.* (2005). *Ecology Letters*
- ³ Hladik *et al.* (2018). *American Chemical Society*