Research Summary

How do prairie restoration and prescribed fire affect bumble bees?

Jade M. Kochanski, MSc.
Graduate Student
jkochanski@wisc.edu

Why is habitat restoration and management important? Wild bees, including bumble bees, pollinate 35% of crops and 85% of all flowering plants. Therefore, it is important to conserve these animals because they pollinate most food sources for both humans and wildlife. Bumble bees in Wisconsin and the US have been experiencing population declines for several decades. One key contributor to these declines is loss of food (i.e., pollen and nectar from flowers) and nesting habitat. Habitat restoration is a conservation practice to support wildlife that is widely used to counteract the negative effects of habitat loss and fragmentation. It is also necessary to maintain restoration with regular management like prescribed fire, but management may have unintended impacts on animal populations.

In **this study**, we measured bumble bee population size and species diversity at Natural Resources Conservation Service easements in Southern Wisconsin that varied in time since last prescribed burn. We will also examine other indicators of bumble bee population health, including genetic diversity and body size.

Main Conclusion: So far, we have not found evidence that suggests prescribed burns are detrimental to bumble bee communities. However, we are continuing to collect data and further examine the impacts of prescribed fire on bumble bees throughout their life cycle to help make science-based management decisions.

Conservation facts: The Rusty-Patched Bumble Bee (*Bombus affinis*; pictured above, left) was listed under the Federal Endangered Species Act in 2017. Southern Wisconsin is one of the last places where you can still find them! The American Bumble Bee (*Bombus pensylvanicus*; pictured above, right), is also a declining species that can be found in Wisconsin.

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Summary of Key Findings

1 **Bumble bee communities are similar across all easements we surveyed, regardless of time since last burn.** The number of bees, number of species, and the species present were similar. We observed 10 different species across all easements, including the endangered Rusty-Patched Bumble Bee. The species observed at your easement are circled.

Species of conservation concern

Rusty-Patched
(*B. affinis*)

American
(*B. pensylvanicus*)

Yellow
(*B. fervidus*)

Common Eastern
(*B. impatiens*)

Brown-Belted
(*B. griseocollis*)

Red-Belted
(*B. rufocinctus*)

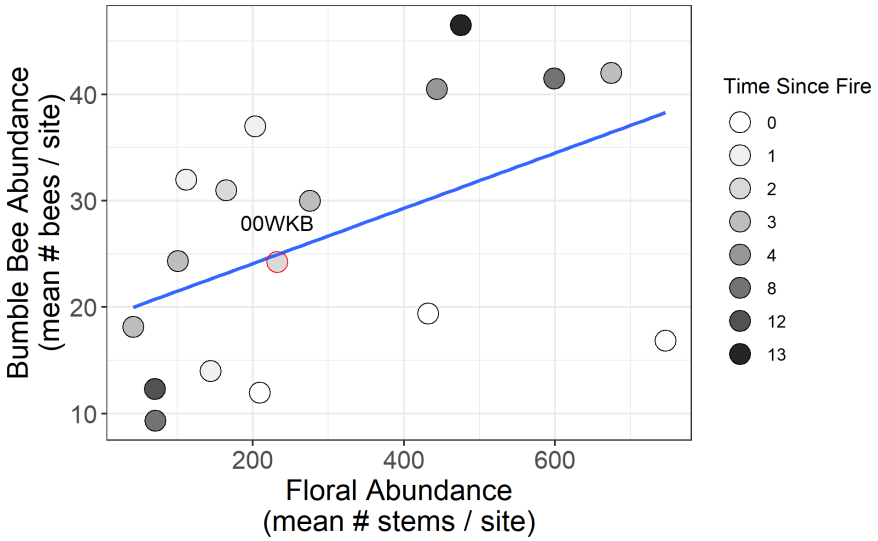
Black and Gold
(*B. auricomus*)

Half-Black
(*B. vagans*)

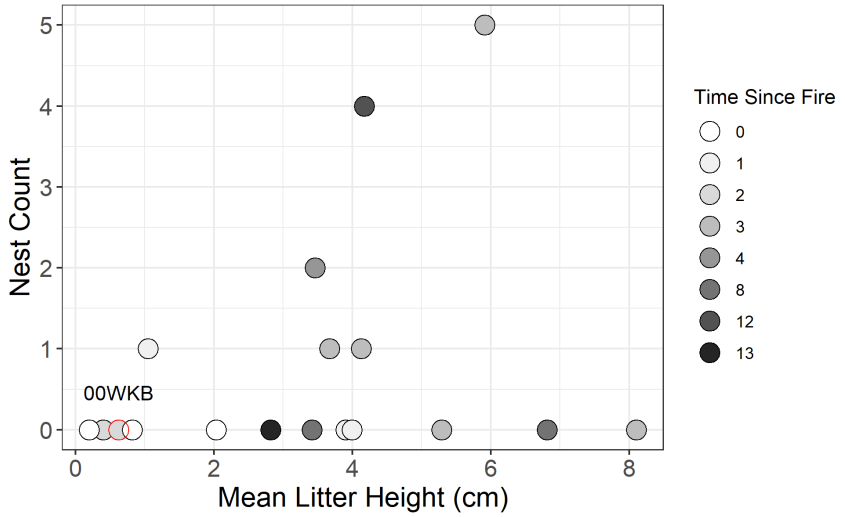
Two-Spotted
(*B. bimaculatus*)

Lemon Cuckoo
(*B. citrinus*)

2 **Bumble bee abundance increases with abundance of flowers,** regardless of the time since last prescribed fire. The figure to the right shows data for 17 unique study plots from 2022, where each plot is represented by a point. The shade of the point represents the time since last fire and the blue line indicates a significant positive relationship between bumble bee and flower abundance. Your easement is highlighted in red and labeled.



3 **The number of bumble bee nests may not be affected by the amount of litter at sites that vary in time since last prescribed fire.** Nests are difficult to find, so more years of data will help us understand this relationship. The figure at right shows cumulative nest counts from surveys at 18 unique plots in 2022; each point represents a plot. We found 1 *B. fervidus* nest in 2021 but none in 2022. Your easement is highlighted in red and labeled.



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