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# Climate change negatively impacting bumblebees, study finds

by Simon Fraser University



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Temperature changes have negatively impacted most species of bumblebees over the past 120 years, according to new research published this week in *Biology Letters*. The researchers note that changes in temperature had more of a negative impact than other factors—such as precipitation or floral resources.

"Bumblebees are important pollinators for wild plants and for the crops humans rely on for food. That's why we need to develop conservation strategies that account for the future impacts of climate change on bee populations," says study lead Hanna Jackson, a Masters student in the M'Gonigle Lab in biological sciences at Simon Fraser University.

Jackson and her colleagues analyzed an existing dataset containing records on 46 bumblebee species across North America between 1900—2020. They created two occupancy models—one focused on time and the other on environmental factors—to estimate effects of climate and land-use variables on species' occupancy, a measure of where species are found. They found that six bumblebee species decreased through time, 22 increased and the remaining 18 were stable.

They note that temperature and precipitation both increased, on average, between 1900 and 2020 in the post-industrial revolution period. Temperature changes had primarily negative impacts on bumblebees, with 37 of the 46 species exhibiting greater declines or less positive increases in occupancy under observed temperature changes compared to if the temperature had remained constant.

Importantly, nine species of bumblebee exhibited declines that link to changing temperatures within their ranges. The team did not find patterns in the other factors that were studied, such as precipitation and only one species declined based on floral resources.

In fact, both floral resources and precipitation had mixed results. Approximately half of the bumblebee species were negatively impacted by changes in precipitation or floral resources while the other half were positively impacted.

Therefore, researchers conclude that changing temperatures are a major environmental factor driving changes in bumblebee community composition.

"Because bumblebee species likely vary in their future responses to land-use and climate change, conservation action should prioritize individual species, taking into account their unique climate and habitat preferences," adds Jackson.

Study collaborators include U.S.-based Pollinator Partnership, Xerces Society for Invertebrate Conservation, and the Department of Biological Sciences at the University of Southern California.

**More information:** Hanna M. Jackson et al, Climate change winners and losers among North American bumblebees, *Biology Letters* (2022). DOI: [10.1098/rsbl.2021.0551](https://doi.org/10.1098/rsbl.2021.0551)

**Journal information:** [Biology Letters](#)

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