

Climate change could cause decline of some alpine butterfly species

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Alpine butterflies, such as the Rocky Mountain Apollo pictured here, will see negative long-term effects of climate change. Credit: Alessandro Filazzola

Some alpine butterflies may be at risk because of the effect of climate change on their ecosystems, according to new research out of the University of Alberta.

"We often frame the effects of [climate change](#) directly on a species as the future becoming either too hot, too dry or too wet," said Alessandro

Filazzola, a post-doctoral fellow in [biological sciences](#) and lead author on the study.

"However, climate change can have indirect effects such as through the food resources of a species. These effects are more likely to affect butterflies, because as caterpillars they often feed on one or a few [plant species](#)."

The researchers used climate change models to understand the effects of changing ecosystems on alpine butterflies in North America. The results show that alpine butterflies that have specialized diets, meaning they feed on just one or a few plants, are more vulnerable to climate change because of fluctuations in their food. On the other hand, butterflies with more diverse diets are less likely to be affected.

"The main outcome from this study is our improved ability to quantify the complex effects of climate change on ecosystems," said Filazzola, who conducted the research under the supervision of professors Jens Roland and JC Cahill.

"Understanding the effects of climate change on a species through its [food items](#) is very important for biological conservation—climate change is likely going to have complex effects that extend beyond single-species mortality."

Models like the one used in this study provide a more [holistic approach](#) to understanding how a changing [climate](#) could affect entire ecosystems.

"Using an approach that looks at the ecosystem level would improve our ability to mitigate biodiversity loss and maintain the delivery of ecosystem services such as pollination," added Filazzola.

The study, "Inclusion of Trophic Interactions Increases the Vulnerability

of an Alpine Butterfly Species to Climate Change," was published in *Global Change Biology*.

More information: Alessandro Filazzola et al. Inclusion of trophic interactions increases the vulnerability of an alpine butterfly species to climate change, *Global Change Biology* (2020). [DOI: 10.1111/gcb.15068](https://doi.org/10.1111/gcb.15068)

Provided by University of Alberta

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