

Wildlife response to climate change is likely underestimated, experts warn

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King and colleagues analyzed data collected by thousands of volunteers for the North American Breeding Bird Survey to determine shifts in northern latitude and upper elevation boundaries of 40 songbird species between two time periods, 1977 to 1981 and 2006 to 2011. Credit: David King

Analyzing thousands of breeding bird surveys sent in by citizen scientists

across the western United States and Canada over 35 years, wildlife researchers report that most of the 40 songbird species they studied shifted either northward or toward higher elevation in response to climate change, but did not necessarily do both.

This means that most previous studies of potential [climate change](#) impacts on wildlife that looked only at one factor or the other have likely underestimated the effects of environmental warming, say research wildlife biologists David King at the University of Massachusetts Amherst and Sonya Auer of the University of Glasgow, U.K. Their study appears in the current issue of *Global Ecology and Biogeography*.

As King explains, "In research on the effects of climate change, studies have shown birds and other organisms shifting north in latitude and others show that [species](#) are moving up in [elevation](#), but we're not aware of any others that have looked at both simultaneously."

He and Auer analyzed data collected by thousands of volunteers for the North American Breeding Bird Survey to determine shifts in northern latitude and upper elevation boundaries of 40 songbird species that occurred between two time periods, 1977 to 1981 and 2006 to 2011. The 25-year gap is an adequate time over which climate change effects can be observed, King points out. Across the 40 species studied, northern boundaries shifted northward about 21 miles (35 km) and about 216 feet (66 m) up in elevation, the authors report.

"We found that if you only look at latitude or elevation, you might interpret the lack of latitude shift as a lack of response. You might even conclude that the species is not sensitive to climate change, but in fact our results indicate that some birds are following their climate niches in elevation and not latitude. So failure to consider both might cause you to miss or underestimate the effect. We strongly feel that new studies should consider both elevation and latitude. And especially if they

observe no shift in latitude, researchers should consider adding the other dimension."

The two scientists also looked for a common set of species-level traits such as life history, ecological generalization and dispersal capability that might provide a framework to allow ecologists to make general statements about how species are going to respond to climate change in the future. They say clutch size as a marker for reproductive strategy and diet breadth as a mark of a "generalist" species that is more flexible in food requirements can be helpful in predicting a species' response to climate warming.

King says, "These two things can be part of a framework for making general statement about how species are going to respond. A central part of the challenge of climate change is trying to predict how things are going to change in the future. Now, if you give me the diet breadth of a species, I can give you an idea of its response to climate change based on our analysis."

They found that "generally speaking, birds with smaller clutch sizes showed greater shifts in latitude, but greater clutch size showed more shift in elevation," King says. "A more satisfying marker is the diet breadth, where we found birds with narrower diet breadth shifted farther up in [latitude](#) and elevation than birds with wider diet breadths, which is what we expected to see."

More information: Paper: [onlinelibrary.wiley.com/doi/10 ...
1/geb.12174/abstract](https://onlinelibrary.wiley.com/doi/10.1111/geb.12174/abstract)

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