Shifting terrain

UW study finds global warming is moving birds' "climate sweet spot"

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Brooke Bateman, a UW-Madison researcher, holds a yellow warbler. Bateman and her colleagues have studied how climate

change is affecting birds in the U.S.

Between late April and the end of summer, lucky birders might catch sight of the elusive hooded warbler on Picnic Point, where at least one has been spotted in the last few years. Or they might do better venturing into Kettle Moraine State Forest's thick understory, where the warblers nest in greater numbers.

Here in southern Wisconsin, we're at the northwest border of their breeding range. But a recent study found that this edge is shifting by 1.6 miles each year, as the birds follow their climate "sweet spot," headed for the prairies and grasslands of the Dakotas.

The range of the hooded warbler is just one of 285 U.S. land bird ranges that UW-Madison postdoctoral researcher Brooke Bateman and her colleagues studied in what they call the "largest examination of the velocity of climate change for birds in the United States in the recent past."

"We found that in the face of climate change, a suitable climate for birds has been moving, on average, eight-tenths of a mile per year — about twice the pace predicted by earlier studies," she reports. Even more surprising is that "it's moving west and northwest, and not just north. People used to think, with global warming, that species would move poleward to beat the heat, but the changes in rainfall and extreme weather events are equally influential."

This could spell trouble for many birds. Hooded warblers, for example, are "not suited to crops and grassland habitats," Bateman says, preferring damp, leafy woodlands instead. Out West, they may not find the right nesting options or food and could face "novel predators or competitor species, new

diseases, higher exposure to threats such as brown-headed cowbird nest parasitism."

And then there are human hazards — people modifying habitats or disturbing birds as they nest. The Florida scrub jay, for example, is another bird whose climate sweet spot is on the move. Theirs is contracting and moving west. "This suggests that [birds are] running into either coastal development or the Gulf of Mexico, which could cause problems for this threatened species," Bateman says.

To get to these findings, researchers combined detailed weather records for the lower 48 states with citizen-generated data on "bird occurrences" dating back to 1950 from the Global Biodiversity Information Facility and the North American Breeding Bird Survey. "This allowed us to look at how, for each species, the climate sweet spot changed between 1950 and 2011," Bateman says.

To check their work, they created a computer model and used it to predict where the same climate conditions for those birds would have been located in 2011 and compared it to data from the 2011 North American Breeding Bird Survey. Their predictions matched.

The implications of the study are obvious to Bateman. “We have to acknowledge that climate change is already occurring and affecting species, and that the rate is much faster than previously observed and faster than anticipated. In addition, the landscape is highly modified and there are additional human-based pressures that species now have to deal with.”

The results, she believes, also emphasize the need for connected habitat that allows plants and animals to move as climate change continues. “The ideal situation would be to secure large amounts of land to allow connectivity between current protected areas and areas that will become suitable. We need to think together, to make the landscape more hospitable to all of the wildlife that depends on it.”