Warming Could Slash Species' Habitat Ranges in Half

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By Michael D. Lemonick

Vast numbers of plant and animal species could see their ranges slashed in half later this century as a result of climate change, according to a study in Nature Climate Change. The result, say the authors, could be serious ecosystem disruptions along with the loss of so-called "ecosystem services," such as the purification of air and water; erosion and flood control; and the recycling of nutrients that natural systems provide.

Earlier studies have focused on the complete extinction of species; this one, by contrast, deliberately steered clear of those at unusually high risk. "We wanted to focus on common, widespread species," said lead author Rachel Warren, of the University of East Anglia, in the United Kingdom, in an interview.

In the end, Warren and her colleagues looked at about 50,000 species drawn from an international database, and compared how fast climate zones are likely to shift with how fast individual species can move in order to keep up with that shift.

What they found was that about 57 percent of plants and 37 percent of animals are likely to see their habitats slashed by 50 percent or more by 2080, if greenhouse gas emissions grow unabated.

"The terrifying loss of biodiversity predicted by this study shows that climate chaos will fundamentally transform our planet," said Shaye Wolf, climate science director for the Center for Biological Diversity, in San Francisco, in a statement.

While some may think that ranges would simply shift — and not shrink — as the planet warms, that's not the case. If a given species lives at high altitude, for example, its range will shift even higher — but when it gets to the top of a mountain, there's no place higher to go.

Warming temperatures also drive habitat ranges away from the tropics and toward the poles, but, said Warren, "in some places, like southern Africa or southern South America, you can't go any further south." And even if a species lives on a flat plain far from any coast, she said, and the new climate zone has the same area as the old, "a species has to be able to get there."

If a species can't keep up with the moving climate zone, its range will be constricted in any case. "Mammals and birds have an easier time. Amphibians, reptiles, and especially, plants, have more trouble," Warren said. A plant that reproduces by dropping seeds a few meters from the parent, she said, "can only move a short distance with every generation."

This shows yet another problem with shifting ranges: if different plants and animals within an ecosystem move at different rates, the ecosystem itself might be disrupted — if, say, animals moved faster than the plants they've evolved to prefer, they could suffer. "That's something we didn't include in this study, which is one reason our projections are actually somewhat conservative," Warren said.

The only good news is that these disruptions aren't inevitable: they could be partially forestalled by cutbacks in greenhouse-gas emissions. "With mitigation . . . losses are reduced by 60 percent if emissions peak in 2016 or 40 percent if emissions peak in 2030," Warren and her colleagues wrote.

Whether that's likely to happen is another story. "Obviously, I'm aware that the political machine is working very slowly," Warren said. Still, several countries have at least made pledges to reduce their emissions. "There's still a large gap between what these commitments would deliver and what we call for. But at least those are steps in the right direction," Warren said.