

# Global Warming Increases Species Extinctions Worldwide

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Global warming has already caused extinctions in the most sensitive habitats and will continue to cause more species to go extinct over the next 50 to 100 years, confirms the most comprehensive study since 2003 on the effects of climate change on wild species worldwide by a University of Texas at Austin biologist.

Dr. Camille Parmesan's synthesis also shows that species are not evolving fast enough to prevent extinction.

"This is absolutely the most comprehensive synthesis of the impact of climate change on species to date," said Parmesan, associate professor of integrative biology. "Earlier synthesis were hampered from drawing broad conclusions by the relative lack of studies. Because there are now so many papers on this subject, we can start pulling together some patterns that we weren't able to before."

Parmesan reviewed more than 800 scientific studies on the effects of human-induced climate change on thousands of species.

"We are seeing stronger responses in species in areas with very cold-adapted species that have had strong warming trends, like Antarctica and the Arctic," said Parmesan. "That's something we expected a few years ago but didn't quite have the data to compare regions."

Previously published predictions, including those co-authored by Parmesan in a 2001 Intergovernmental Panel on Climate Change report,

were that species restricted to cold climate habitats like the Earth's poles or mountain tops and with narrow temperature tolerances (for example, tropical corals) would be most affected by global warming. Less than a decade later, those predictions have been born out.

The most sensitive species are going extinct and/or shifting their ranges geographically as their original habitats become inhospitable. The studies reviewed by Parmesan reveal this trend will continue.

“Some species that are adapted to a wide array of environments-globally common, or what we call weedy or urban species-will be most likely to persist,” said Parmesan. “Rare species that live in fragile or extreme habitats are already being affected, and we expect that to continue.”

The studies Parmesan analyzed also show that some species—those with short generation times like insects—are evolving in response to climate change, but not in ways that could prevent extinction.

“Some populations are adapting, but species are not evolving anything that's really new, something we haven't been able to say before because we didn't have enough studies,” Parmesan said. “To really come up with something new that's going to allow a species to live in a completely new environment takes a million years. It's not going to happen in a hundred years or even a few hundred years. By then, we might not even think of it as the same species.

“The good news is that some species already had a few individuals that were good at moving, so some populations are evolving better dispersal abilities. These species are able to move faster and better than we thought they could as climate warms at their northern range boundaries. So, they're expanding into new territories very rapidly.”

Parmesan said that pests and diseases are also showing the same

northward shifts as other wild animals.

Parmesan also found that, at present, scientists cannot predict exactly which species will respond to climate change based on what kind of organism it is. Within groups of animals and plants, some species respond to climate change and others do not.

“Whether it’s within fish, trees or butterflies, you’re seeing some species responding strongly and some staying fairly stable,” said Parmesan. “But within each group you’re still seeing about half of the species showing a response. It’s a very widespread phenomenon.”

Parmesan’s review is published online in the *Annual Review of Ecology, Evolution, and Systematics* and is scheduled to appear in the print version of the journal this December.

Source: University of Texas at Austin

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