

People, climate, and water supply all played a role in the extinction of Australia's megafauna

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The Pleistocene kangaroo *Procoptodon goliath*, the most extreme of the short-faced kangaroos, was the largest and most heavily built kangaroo known. It had an unusually short, flat face and forwardly-directed eyes, with a single large toe on each foot (reduced from the more normal count of four). Each hand had two long, clawed fingers that would have been used to bring leafy branches within reach. Credit: ARC Centre of Excellence for Australian Biodiversity and Heritage (CABAH)

The mystery of the role of people and climate in the fate of Australian megafauna might have been solved in a breakthrough study published today.

"Megafauna,' giant beasts that once roamed the continent—including wombat-like creatures as big as cars, birds more than two meters tall, and lizards more than seven meters long—became extinct about 42,000 years ago. But the role of people in their demise has been hotly debated for decades.

The new study, led by a team of researchers from the ARC Centre of Excellence for Australian Biodiversity and Heritage (CABAH), analyzed fossil data, climate reconstructions, and archaeological information describing patterns in [human migration](#) across south-eastern Australia.

The team developed and applied sophisticated mathematical models to test scenarios to explain [regional variation](#) in the periods during which people and megafauna coexisted.

For the first time, the research suggests a combination of climate change and the impact of people sealed the fate of megafauna, at least in south-eastern Australia. And that distribution of freshwater—a precious

commodity for animals and people alike as the climate warmed—can explain [regional differences](#) in the timing at which megafauna died out.

"There has been much debate among scientists about what conditions led to this [extinction event](#)," said lead author Dr. Frédéric Saltré, Research Fellow and Coordinator of the Global Ecology Lab at Flinders University.

"Resolving this question is important because it is one of the oldest such extinction events anywhere after modern human beings evolved and left Africa," he added.

The findings, published in *Nature Communications*, are the result of analysis and complex modeling based on data including more than 10,000 fossils and archaeological records. Using high-quality [fossil data](#) and archaeological evidence of human activity, the researchers were able to map regional patterns of megafauna extinction.

They developed sophisticated models to test the impact of factors including climate, [water availability](#), and human activity on localized patterns of megafauna extinction.

The extinction pattern could only be explained by the combination of people sharing the environment and the reduced of availability of freshwater due to climate change.

"The regional patterns in extinction are best explained by the hypothesis that people migrated across Australia, exploiting lakes and other sources of drinking water connecting the drier regions in between," said co-investigator Professor Corey Bradshaw of the Global Ecology Lab at Flinders University.

"It is plausible that megafauna species were attracted to the same

freshwater sources as humans, thus increasing the chance of interactions."

The new insight that human pressure and climate change work together to trigger species extinction is a "stark warning" for the immediate future of the planet's biodiversity facing even stronger [climate](#) and habitat disruption, Dr. Saltré concluded.

More information: Frédéric Saltré et al. Climate-human interaction associated with southeast Australian megafauna extinction patterns, *Nature Communications* (2019). [DOI: 10.1038/s41467-019-13277-0](https://doi.org/10.1038/s41467-019-13277-0)

Provided by Flinders University

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