

Alpine parrot may have gone to the mountains to avoid people

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Credit: Unsplash / Karl Anderson

With global warming decreasing the size of New Zealand's alpine zone, a University of Otago study found out what this means for our altitude-loving kea.

The study, published in *Molecular Ecology*, analyzed whole genome DNA data of the kea and, for the first time, its forest-adapted sister species, the kākā, to identify genomic differences which cause their habitat specializations.

The researchers found the kea is not an alpine specialist, but rather one that adapted to using such an open habitat because it was least disturbed by human activity.

Co-author Associate Professor Michael Knapp, of the Department of Anatomy, says that is not likely to surprise people who know the wide altitudinal range in which kea can be found, but it does not mean the species is out of the woods in terms of threats from a [warming climate](#).

"If kea use the alpine zone as a retreat from human activity, then what other options do they

have if the alpine zone disappears? Will they increase their use of forest habitat, potentially increasing competition with kākā?" he asks.

To predict how kākā and kea may respond to a warming climate, the researchers also reconstructed the species' demographic histories to understand how they responded to ice age climate and [habitat](#) changes.

Kea habitats expanded during glacial periods and kākā habitats expanded during interglacial ones. During these climate changes, kea populations remained stable and relatively small, while kākā populations varied broadly, reaching large population sizes under optimal conditions. The researchers believe this may be because kea is less able to capitalize on favorable conditions.

"It is important to know how alpine species will respond to climate warming so the best conservation decisions can be made to protect them, that is particularly true in isolated island environments with very limited opportunities for species to go anywhere else," Associate Professor Knapp says.

Lead author Denise Martini, Ph.D. candidate in the Department of Anatomy, says the study is "barely scraping the tip of the iceberg" in terms of what scientists could still discover from looking into kākā and kea evolution.

"Unfortunately, when it comes to conservation decisions we are often forced to invest in short-term 'emergency' solutions, and it is rare for researchers and conservation practitioners to have the opportunity to really look into prospects for the long-term survival of a species.

"Making those kinds of predictions in a changing environment requires the sort of in-depth knowledge that is simply not available for a lot of species at immediate risk of extinction. I am hopeful

that with the help of new emerging technologies and increased public awareness on environmental matters we will be able to get past the limitations we have now," she says.

Associate Professor Knapp is also hopeful about scientists increasingly studying whole genomes and environmental adaptations on a molecular level.

"We are now able to start looking into how exactly [species](#) have adapted to their environment on a [molecular level](#), and that may help us to support conservation efforts with much more informative genetic data than was previously possible. We think that it is an exciting prospect which we hope will help preserve what is left of the iconic New Zealand bird fauna."

More information: Denise Martini et al, Evolution of the world's only alpine parrot – genomic adaptation or phenotypic plasticity, behavior and ecology?, *Molecular Ecology* (2021). [DOI: 10.1111/MEC.15978](#)

Provided by University of Otago

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