Near-extinct African amphibians 'invisible' under climate change

September 5 2014

Barbour's forest tree frog (Leptopelis barbouri) in the Udzungwa Mountains, Tanzania. The species is ‘Vulnerable’ on The IUCN Red List. Credit: Michele Menegon.

An international team of researchers has found that the majority of threatened species are 'invisible' when using modern methods to predict species distributions under climate change.

Using African amphibians as a case study, the researchers found that more than 90 per cent of the species listed as threatened on The IUCN Red List of Threatened Species are omitted by the most popular tools for

species distribution modelling.

The study, led by researchers from the Universities of York and Copenhagen and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) in Cambridge, is published in the journal *Diversity and Distributions*.

Dr Philip Platts, lead author and Research Fellow with York's Environment Department, said: "Modern methods to predict species distributions under climate change typically leave out rare and threatened species - the ones that currently underpin global spending on conservation. This is because those species, almost by definition, have too few data for their spatial distributions to be modelled using standard tools. We looked at whether missing them out makes a difference for conservation priority setting, either now or under future climates."

The researchers found that under the current climate, statistical restrictions on species distribution modelling means that important sites for narrow-ranging and threatened species are systematically down-played. They say this issue spans many species-groups and is only partially mitigated by modelling at finer spatial scales.

However, when they looked at climate change in the future, they found that persistence among both narrow and wide-ranging species is likely to be highest in sites already identified for conservation investment. Many such sites are projected to experience lower rates of climatic change, echoing historical processes underlying their importance. The wealth of species accumulated, in part, because they were able to persist during large-scale climatic shifts.

The researchers conclude that the focus on existing priorities ought to be maintained, noting that due to forest clearance for agriculture and demand for wood-based fuels, many species could now be incapable of

tracking even relatively small changes in climate.

Dr Raquel Garcia, from the Centre for Macroecology, Evolution and Climate (CMEC) at the University of Copenhagen, who co-led the study, said: "Effective biodiversity conservation, both now and in the future, relies on our ability to assess patterns of threat across all species, but particularly those close to extinction. There are ways around the problem, such as combining simple measures of exposure to climate change with knowledge of species' ability to disperse or adapt – methods less reliant on sophisticated modelling tools, which are impractical for many of the rarest species."

The researchers examined data on 733 African amphibians in Sub-Saharan Africa. They found that 400 have too few records to be used in species distribution modelling at continental scales, including 92 per cent of those listed as Vulnerable, Endangered or Critically Endangered on The IUCN Red List. Amphibians were chosen for the study because of the high rates of threat they are predicted to face from climate change, habitat loss and disease, especially in Africa.

Professor Neil Burgess, Head of Science at UNEP-WCMC and Principal Investigator on the study, said: "These results show that unless we use appropriate analysis for the impacts of climate change on species such as amphibians, we risk leaving many rare species under-represented in conservation plans, with the potential to misguide conservation efforts on the ground."

More information: The article "Conservation implications of omitting narrow-ranging taxa from species distribution models, now and in the future" is published in *Diversity and Distributions*.