

Scientists call for more robust measures to identify and protect endangered species

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Conservationists may need to change their approach to protecting animals and plants from extinction if they are to successfully shield key species and habitats from the effects of global climate change, according to a new review in the journal *Science*.

Scientists and conservation organisations currently work out a species' [extinction risk](#) by determining how likely it is that climate change will make its habitat unsuitable. They then focus their efforts on protecting species whose location is threatened by changing temperature and rainfall.

However, these are not always the animal or [plant species](#) that need the most protection, say the authors of the new study, from Imperial College London, the Universities of Dundee and Bristol in the UK, Wyoming in the USA and Macquarie in Australia. This is because some species are more sensitive to changes in climate than others; some are able to adapt to change and some find it easy to relocate to new suitable areas.

The researchers are proposing that scientists use a comprehensive 'vulnerability assessment', using a wider selection of data, to provide a more accurate picture of which species and habitats in which places are likely to be most at risk.

For example, in the UK countryside some species are more adaptable than others. As habitats occupied by species like foxes and otters in the UK have been consistently shrinking over the last centuries because of

expanding land developments, species such as otters have exhibited the expected decline in population numbers, while others such as foxes have been able to relocate to urban areas and adjust to a new way of life. Climate change is likely to have a similar effect. Some species will be more adaptable than others, but to date this information has not been incorporated into planning.

In order to address this, the new vulnerability assessment would draw upon a wide array of information sources, including [field observations](#) and monitoring; ecological experiments; records of ecological consequences of past climate change; and computational models incorporating ecological and evolutionary processes.

Professor Georgina Mace FRS, CBE, from the Grantham Institute for Climate Change at Imperial College London and a lead author of the review, said: "It is undoubtedly true that man-made climate change will cause extinctions and disrupt natural ecologies and it may also happen too fast for evolutionary change to keep up. However, we are limited in our current understanding of how plant and animal populations will react to short-term changes in their environment.

"I believe our recommendations for a new vulnerability assessment will mean we are able to target our conservation efforts to protect the most vulnerable species and habitats. You could think of it like the UK Government's practice of handing out heating bill subsidies to elderly and vulnerable people during the winter. This is more effective and efficient than giving subsidies to everybody living in a cold part of the country regardless of their ability to financially support themselves or go on holiday to Spain for the winter."

The new assessment could lead to a reduction in intensity or extent of some conservation programmes and it could also mean taking a laissez faire approach to some more resilient species or habitats, in order to free

up resources to manage those that are highly vulnerable. The authors argue that targeting efforts more closely would have the added benefit of being more efficient and effective way of operating.

Some conservation organisations are already beginning to collect and monitor data that would help them implement the recommendations made in this study. However, the authors say they would make more progress if they aligned their efforts to a coordinated framework, such as the vulnerability assessment. They say that the combination of a change in practice and research using the newly collected and collated data will only improve the chances we have to save key plant and animal species for the future.

Professor Terry Dawson, SAGES Chair in Global Environmental Change at the University of Dundee and a lead author of the review, said: "Our existing models are not wrong. We have been working with them for many years, and they are undoubtedly useful as far as they go, but they have their limitations. They are not an exact picture of how things will develop in future. We need to take into account many factors that are not included in the models if we are to deal with the serious problems posed by climate change.

"Climate change will have a major impact on life on earth, but there is growing evidence that many species are adapting to it and the reality is that there are a lot of complex factors at play that need to be examined. Some species are doing quite well without intervention, hence it may be that some interventions are unnecessary and ineffective."

Evidence from current monitoring schemes has suggested that some endangered species are faring better than [conservationists](#) expected. "We don't really understand why some species can cope with climate change while others can't," said co-author Professor Stephen Jackson from the University of Wyoming in the USA. "It's possible that some species have

a delayed response to climate change, but it's clear that some species in some places can quickly adapt when the environment is going bad for them. If we can determine how they do this, we can leverage natural adaptive capacity in conservation management."

"Now is the time for conservation biology to move beyond predictions to analysis, diagnosis, and design and implementation of effective measures to protect biodiversity," said co-author Professor Colin Prentice, formerly of the QUEST (Quantifying and Understanding the Earth System) programme created by Natural Environment Research Council (NERC) at the University of Bristol, and now at Macquarie University in Australia.

Provided by Imperial College London

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