Steps in the right direction for conservation

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As the climate changes, conservationists are divided over the most effective way to preserve animal and plant diversity because they cannot simply preserve the status quo. Ensuring species can shift to track the climate to which they are suited is a complex problem, especially when there are competing demands on land use. A simple prediction is that more habitat would help species to shift, but it is not obvious what the best spatial locations for habitat would be.

A new study led by scientists at the University of York says that well placed habitat "stepping stones" would lead to faster range expansion than the equivalent amount and quality of habitat tacked onto existing sites. The result applies to situations where a species will have to cross gaps of several times the distance one individual can normally traverse, i.e. to species whose habitat is fairly rare.

This will be relevant to numerous species that are already threatened for reasons other than climate change, and have very little habitat available. For example, the most important wildlife sites in Europe (called the Natura 2000 sites) make up 18 per cent of the land area, and the habitat for any one priority species will be much less than that.

The study, which is published in PLOS ONE, involved researchers from the Universities of York, Leeds and Aberdeen.

Lead author Dr Jenny Hodgson, of the Department of Biology at York, said: "Species in these fragmented habitats would need to make a series of "leapfrogging" moves over multiple generations to colonise new

landscapes. Our research offers a way to identify existing chains of habitat patches that can enable this leapfrogging, but that may not seem obviously connected when looking at a map. When no suitable chains exist, the method can also help to plan new habitat stepping stones in the gaps that will be most difficult to cross."

The study is ground-breaking because it shows that the speed of spreading through a landscape is not reliably related to the probability of extinction that would be associated with the same landscape. Understandably, conservation planning has usually focused on minimising the probability of extinction from landscapes where a species is already established. This study offers the strongest evidence yet that a "more of the same" conservation policy will not be efficient in an era of climate change.

Co-author Dr Stephen Cornell, from the Faculty of Biological Sciences, at the University of Leeds, said: "We understand very well what can prevent populations going extinct, but until now we have not sufficiently understood what can help them to spread: the underlying science was missing.

"Our work shows that although we cannot maximise both of these goals at once, with a limited amount of habitat, we can find compromise solutions that perform pretty well on both counts."

Chris Thomas, Professor of Conservation Biology at York, said: "The methods we developed will help us identify where real species face gaps between habitats that they will need to cross. The question will then be whether it is practical to create new habitat in these gaps, and whether the re-creation can be achieved quickly enough. We may need to focus on species that nearly have enough habitat to start spreading, and where addition of just a small amount of extra habitat would enable them to do so."

More information: The speed of range shifts in fragmented landscapes, by J.A. Hodgson et al.
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