

Science for Environment Policy

Changes in species interaction provide clues to climate change extinctions

How does climate change cause extinction? An extensive analysis of the available evidence has explored this question and concluded that climate change's effects on the interactions between species is likely to be the main reason for local extinctions. For example, climate change may lead to the loss of prey for predators.

Currently, there is much evidence to show that species 'ranges', i.e. the geographical areas they live in, are changing under the effects of climate change. It is also known that various temperature-linked factors can potentially affect populations, including physiological tolerance to high temperatures, effects on pollinator species and impacts on pathogens and competitors.

The results of this new study suggest that the most crucial factor affecting survival under climate change is disrupted interaction between species, rather than a simple, physiological intolerance to increased temperatures.

The researchers identified a total of 136 existing studies that demonstrated a link between extinction and climate change. Of these, only seven studies identified a specific mechanism by which climate change caused local extinction of populations, none of which involved a straightforward physiological intolerance to higher temperatures. In fact, the majority of the studies suggested that changes in how species interact is the main cause of extinctions linked to climate change, with declines in food availability being the most common cause.

Examples cited by the researchers include: the loss of prey for a planarian worm owing to warmer stream temperatures; a decrease in the availability of plants eaten by a sheep, caused by reduced rainfall; and fish species affected by bleaching of their coral habitat.

Not all the studies were solely linked to man-made, or anthropogenic, climate change, however: four showed the effect of natural climatic oscillations, or recurring climate patterns, on species' extinction; the two most widely discussed examples include chytrid fungus in amphibians and coral bleaching. It is not known how anthropogenic impacts may directly affect these species, although climate oscillations may increase in frequency and severity as a result of man-made changes to the environment.

In seven further research papers, a direct link was also found between climate change and population declines. In these studies, altered species interactions were also found to be the most important cause of reduced populations, particularly in relation to food resources and increased infection from pathogens.

Research approaches that could help improve understanding of the direct factors that cause extinction are suggested. These include tracking changes in species ranges and population sizes over time; statistical tests to link temperature changes to population declines and highlight possible responsible factors; and laboratory and field tests that can help pinpoint the individual mechanisms involved.

According to the researchers, understanding the direct effects of climate change on populations can help policymakers prioritise conservation strategies and improve predictions about future population declines. Understanding what directly causes extinction as a result of changes to the climate should therefore be a priority for future research, especially in the light of new evidence, which suggests that species extinctions in the near future may be a result of a complex interplay of factors and not simply based on the species' physiological ability to withstand higher temperatures.



24 January 2013
Issue 314

Subscribe to free
weekly News Alert

Source: Cahill, A.E.,
Aiello-Lammens, M.E.,
Fisher-Reid, M.C. *et al.*
(2012) How does climate
change cause extinction?
*Proceedings of the Royal
Society B*. Doi:
10.1098/rspb.2012.1890.

Contact:
wiensj@life.bio.sunysb.edu
[u](#)

Theme(s): Biodiversity,
Climate change and
energy

The contents and views
included in *Science for
Environment Policy* are
based on independent,
peer-reviewed research
and do not necessarily
reflect the position of the
European Commission.

To cite this
article/service: "[Science
for Environment Policy](#)":
European Commission DG
Environment News Alert
Service, edited by
SCU, The University of the
West of England, Bristol.