

# Ecosystem resilience

Simon Napper

“The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g. flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g. land use change, pollution, over-exploitation of resources),” says the latest report from the Intergovernmental Panel on Climate Change (IPCC). “Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C,” it continues. “For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species’ ecological interactions, and species’ geographic ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g. water and food supply.

“The progressive acidification of oceans due to increasing atmospheric carbon dioxide is expected to have negative impacts on marine shell forming organisms (e.g. corals) and their dependent species.”

However, one widely discussed impact of climate change is considered less likely. “Based on climate model results, it is very unlikely that the Meridional Overturning Circulation (MOC) in the North Atlantic will undergo a large abrupt transition during the 21st century,” says the report. “Slowing of the MOC this century is very likely, but temperatures over the Atlantic and Europe are projected to increase nev-

ertheless, due to global warming. Impacts of large-scale and persistent changes in the MOC are likely to include changes to marine ecosystem productivity, fisheries, ocean carbon dioxide uptake, oceanic oxygen concentrations and terrestrial vegetation.”

The document published on 6 April summarises the findings of Working Group II, which has been assessing current scientific understanding of the impacts of climate change on natural, managed and human systems, as well as their capacity to adapt and their vulnerability. It was agreed after lengthy meetings lasting through the night and into the morning of 6 April in Brussels.

Martin Parry, co-chairman of WGII, told a press conference in Brussels that the evidence was clear that climate change was now having a direct effect on animals, plants and water. “For the first time, we are no longer arm-waving with models,” he said. “This is empirical data, we can actually measure it.”

This document is a summary for policymakers and not the full scientific work. As such, many of the late night negotiations in Brussels were political, with some countries, notably the US, Saudi Arabia, China and India, asking for the final version to reflect less certainty than originally proposed in the draft.

The summary of the assessment of Working Group I, on the science of climate change, was issued in February while the third part – on mitigation – should appear in May. The full report will be launched in November.

[www.ipcc.ch/SPM6avr07.pdf](http://www.ipcc.ch/SPM6avr07.pdf)

Climate impacts (source: IPCC)

Phenomena	Direction of trend	Occurrence this century
Warmer (and fewer cold) days and nights	warmer/more-frequent hot days and nights over most land areas	Virtually certain (greater than 99% probability)
Warm spells and heat waves	frequency increases over most land areas	Very likely (more than 90% certainty)
Heavy precipitation events	frequency increases over most areas	Very likely
Area affected by drought	increases	Likely (more than 66% probability)
Intense tropical cyclone activity	increases	Likely
Incidence of extreme high sea level (excludes tsunamis)	increases	Likely

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