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Heatwave suddenly shrinks seaweed's range

[Anna Salleh \(http://www.abc.net.au/profiles/content/s2193248.htm?site=science\)](http://www.abc.net.au/profiles/content/s2193248.htm?site=science)

ABC

Shrinking seaweed A recent marine heatwave off Western Australia rapidly shrank the distribution range of an ecologically-important seaweed by about 5 per cent, researchers report.

Scientists say the findings provide further evidence that extreme climate events can cause sudden "stepwise" changes to species distributions, on top of gradual changes brought by climate change.

Marine biologists Dr Dan Smale and Dr Thomas Wernberg, of the [University of Western Australia \(http://www.uwa.edu.au/\)](http://www.uwa.edu.au/), report on the changing distribution of the habitat-forming seaweed, *Scytothalia dorycarpa*, today in the *Proceedings of the Royal Society B* (<http://dx.doi.org/10.1098/rspb.2012.2829>).

"The real benefit of this study is we've actually managed to quantify how much this species contracted its range in response to a single extreme climatic event," says Smale.

In early 2011 the temperate part of the Western Australian coastline experienced a record-breaking heatwave, which lasted for about several months.

In previous research, Smale, Wernberg and colleagues found the heatwave, which saw water temperatures climb to 2-4°C above normal for many weeks, had caused changes to the marine ecology at a couple of specific locations off the Western Australian coast.

Now they have taken a more detailed look at how the heatwave affected one particular ecologically-important seaweed species.

Seaweed studies

The seaweed *Scytothalia dorycarpa* normally grows in shallow waters from the temperate Western Australian and South Australian coasts, around to Tasmania.

Using surveys from hundreds of kilometres of coastline, carried out both before and after the heatwave, Smale and Wernberg were able to quantify the change in the seaweed's distribution in response.

"It seems to have contracted its range more than 100 kilometres pole-wards in response to this heatwave," says Smale. This is approximately 5 per cent of its total distribution.

The researchers also carried out other tests to confirm the heat was to blame for the contraction.

"Through standard lab experiments we showed that the seaweed cannot sustain physiological functions (e.g. photosynthesis) at the temperatures it experienced at the range edge during the heatwave," says Smale.

Permanent change



The seaweed provides habitat and food for other marine species (Thomas Wernberg)

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The researchers say that the contraction of range is likely to be permanent, since the main current the seaweed relies on for dispersal is pole-wards. And since the seaweed provides a habitat and food source for so many other plants and animal the range contraction is likely to have far-reaching implications for the marine ecosystem, they say.

Biologist and ecologist Dr Amanda Bates, of the Institute for Marine and Antarctic Studies at the University of Tasmania, says research on the impact of climate change on species distribution has tended to focus on gradual changes.

For example, studies show the gradual movement of species up mountains coinciding with a warming in climate over 100 years, says Bates, who has been reviewing the literature in this area.

But, she says, Smale and Wernberg's research draws attention to the impact of extreme climatic events on ecosystem structure and species distribution.

"This is a really important layer when you're trying to predict how systems respond to climate change," says Bates, who has collaborated in the past with Smale and Wernberg.

"These extreme events might cause rapid stepwise range contractions that will exacerbate the gradual contraction that would be likely to occur with climate change."

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