

A marine heatwave has wiped out a swathe of WA's undersea kelp forest

July 8 2016, by Scott Bennett, Julia Santana-Garcon, And Thomas Wernberg



The 2011 heatwave hit kelp forests hard along a long stretch of WA coast.
Credit: J. Costa, Author provided

Kelp forests along some 100km of Western Australia's coast have been wiped out, and many more areas damaged, by a marine heatwave that struck the area in 2011.

The heatwave, which featured ocean temperatures more than 2°C above

normal and persisted for more than 10 weeks, ushered in an [abrupt change](#) in marine plant life along a section of Australia's Great Southern Reef, with kelp disappearing to be replaced by tropical species.

As we and our international colleagues [report in the journal *Science*](#), five years on from the heatwave, these kelp forests show no signs of recovery.

Instead, fish, seaweed and invertebrate communities from these formerly temperate kelp forests are being replaced by subtropical and tropical reef communities. Tropical fish species are now intensely grazing the reef, preventing the kelp forests from recovering.

Assessing the damage

We and our team surveyed reefs along 2,000km of coastline from Cape Leeuwin, south of Perth, to Ningaloo Reef between 2001 and 2015.

Up until 2011, temperate reefs were clearly defined by the distribution of kelp forests which formed dense, highly productive forests as far north as Kalbarri in WA's Mid West.

Since 2011, the boundary between these temperate reefs of southern WA and the more [tropical reefs](#) (including Ningaloo) to the north has become less clear-cut. Instead, the sharp divide has been replaced by an intermediate region of turf-dominated reefs.



Kelp forest before (left) and after (right) the marine heatwave.

This has implications for the Great Southern Reef (GSR), which extends more than 8,000km around the southern half of Australia from the southern half of WA all the way to southern Queensland – a coastline that is home to around 70% of Australians.

Kelp forests are the GSR's "biological engine", feeding a globally unique collection of temperate marine species, not to mention supporting some of the most valuable fisheries in Australia and underpinning reef tourism worth [more than A\\$10 billion a year](#).

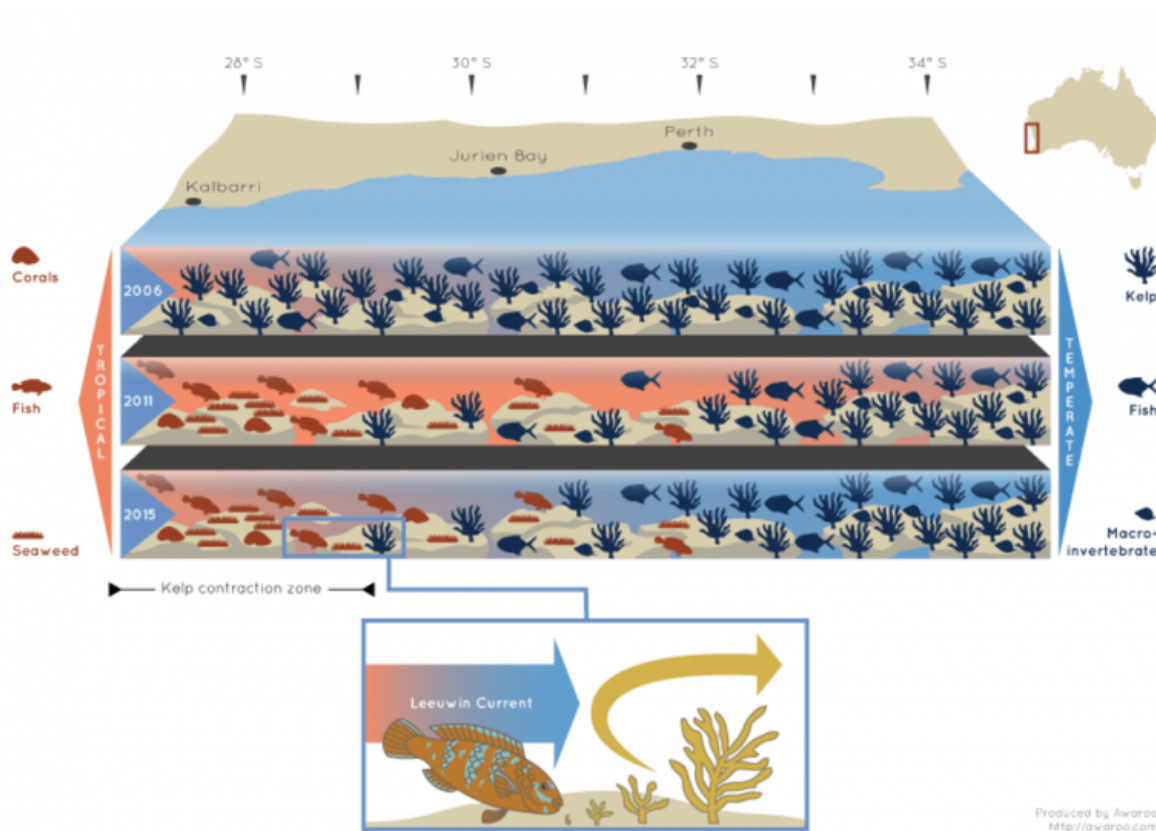
But our research shows that on the GSR's western side, kelp forests are being pushed towards Australia's southern edge, where continued warming puts them at risk of losses across thousands of kilometres of coastline because there is no more southerly habitat to which they can retreat.

While the 2011 [marine heatwave](#) affected some 1,000km of Western Australia's temperate coastline, it was a stretch of roughly 100km

extending south of Kalbarri on the state's Mid West coast that was most severely affected.

In this area alone an estimated 385 square km of kelp forest have been completely wiped out.

Further south, from Geraldton to Cape Leeuwin, the extent of kelp loss was less severe, despite an estimated total area of 960 square km having been lost in the region.



Infographic illustrating the impacts of the heatwave, kelp loss and tropicalisation of temperate reefs. Credit: Awaroo

Northern regions towards Kalbarri were more severely affected because these kelp forests were closer to their limit, and also because this area is closer to the tropical regions like Ningaloo Reef, meaning that tropical species could more easily move in.

The problem was exacerbated by the southward-flowing Leeuwin Current, which helps [tropical species](#) move south while making it harder for temperate species to move north and recolonise the affected areas of the GSR.

The combination of these physical and ecological processes set within a background warming rate roughly [twice the global average](#), compounds the challenges faced by kelp forests in the region.

The plight of WA's kelp forests provides a strong warning of what the future might hold for Australia's temperate marine environment, and the many services it provides to Australians.

More information: T. Wernberg et al. Climate-driven regime shift of a temperate marine ecosystem, *Science* (2016). [DOI: 10.1126/science.aad8745](#)

This article was originally published on [The Conversation](#). Read the [original article](#).

Source: The Conversation

Citation: A marine heatwave has wiped out a swathe of WA's undersea kelp forest (2016, July 8) retrieved 26 April 2024 from <https://phys.org/news/2016-07-marine-heatwave-swathe-wa-undersea.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.