Ocean study’s hot new findings from hotplates

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Effects of ocean warming on marine biodiversity have prompted an international research team to devise a world-first technique to accurately predict the re-distribution of underwater species.

Experts from the Australian Institute of Marine Science, the Natural Environment Research Council in the UK and the University of WA’s Oceans Institute and the School of Plant Biology have collaborated on the development of a series of temperature-controlled underwater settlement panels – or “hotplates” – that can be used to simulate ocean warming conditions in local waters.

A hot plate array 'in situ'. Image: UWA.

Using a test site along the Swan River near North Fremantle, the plates are artificially-heated by a shore-based controller to create a one degree increase in water temperature.

The temperature is maintained for four weeks, after which observations are made on significant ecological responses, particularly the growth of non-mobile marine organisms such as seaweeds, sponges and corals within the water and on the plates themselves.

Oceans Institute scientist and lead researcher for the project Dr Daniel Smale says the integration of a temperature regulator has put a new spin on old marine ecology technology.

“The industry has previously used settlement panels for experiments, changing factors such as nutrient availability or physical disturbance; however, until now nobody has managed to manipulate the temperature around a panel,” Dr Smale says.

“We have developed a system that electrically heats these panels so that we can, in a controlled manner, alter the temperature and make observations relating to the growth or re-distribution of marine organisms.

“Our first experiment ran for 36 days during which we managed to maintain the temperature achievements for over a month, providing ample time for the growth of new organisms which we could observe quite readily.”

Dr Smale says the experiment highlighted higher growth rates in species of sea squirts, a class of immobile filter feeders that live on the ocean floor.

“The thing about environmental change is that you always get winners and losers in the ecosystem,” he says.

”We found the sea squirt became a dominant space occupier on the heated plates and as it was not present on the control plates, its growth was quite an important observation for us.

“The aim of this project is to improve our predictive power and better understand which species will be affected by ocean warming conditions and the rate of their re-distribution.

“If we can achieve that, we may increase our chances of being able to better manage and conserve our complex marine biodiversity and ecosystems.”

Dr Smale and his team are hoping to conduct future experiments in identified ocean warming hotspots such as Cockburn Sound, Coral Bay and the Abrolhos Islands.

Written By Imelda Cotton

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