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A crystal ball for coral reefs

[Colin Simpson](#)

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They are found in some of the harshest conditions that marine life endures anywhere on Earth, not just surviving but positively thriving amid soaring temperatures and extreme salinity.

Yet just-completed research has revealed that the coral reefs off the Musandam Peninsula are healthier than ever. Remarkably, the coral has expanded its already extensive spread over the seabed during the past year despite living in an environment that would be fatal to reef-building organisms anywhere else in the world.

Now scientists are trying to work out just how the coral is managing to flourish in such severe conditions, which could help them predict how climate change will affect reefs elsewhere.

Rita Bento, a Dubai-based marine biologist who works for the Emirates Diving Association and who led the research in the Strait of Hormuz, says that

studying the coral off Musandam was like looking into the future.

Although the full analysis has yet to be completed, it is clear there is a slight but steady increase in the area covered by coral.

"We have a slight increase in the coral coverage," she said. "I can't say much more yet as I haven't done the statistical analysis, but I can see there's a slight increase.

"We have seen increases since 2009, we've been seeing an increase in coral coverage in general from year to year.

"In this region you have high salinity and high temperatures and corals survive despite conditions that they wouldn't survive in other areas of the world, so it is like going to the future and seeing what will happen with climate change.

"If you understand how the reefs adapt or they get more resilient to conditions then you will understand what will happen in other places."

In some areas off Musandam the coral coverage reaches 90 per cent. "That's amazing, you don't have that in other regions or even in other areas here in the UAE and Oman. The normal average around the world is 30 per cent."

Seas around the world are getting hotter and more saline, and there are fears about the effect this will have on coral.

"Some won't survive. It depends on the family and the species," Ms Bento says. "So by studying here we understand how the structure of the coral reefs will change, and which families will die first." That should make it easier to predict what will happen elsewhere.

Reefs in the Strait of Hormuz face other threats, such as oil spills from passing tankers and poor visibility - corals normally require plenty of light.

Local scientists are not the only ones hoping the Gulf's coral will be a crystal ball for the world's reefs. A new report by a team from Florida's Nova Southeastern University (NSU) Oceanographic Centre describes the "small and shallow sea" of the Gulf as a good analogue for future conditions of the world's oceans.

"The fact that corals can persist in such a demanding environment indicates that they have been able to acclimatise and selectively adapt to elevated temperature," says the report, by Sam Purkis, Abigail Renegar and Bernhard Riegl. "The implication being that colonies elsewhere may be able to follow suit."

The authors add that this gives hope that corals elsewhere might, given time, similarly adapt to survive changes resulting from an increase in atmospheric carbon dioxide.

Still, says Ms Bento, more research is needed into the reefs off Musandam. The type of study required to understand how the coral had adapted to the harsh conditions was outside the scope of the work her team carried out in October.

Thirteen volunteer divers spent a week living on a dhow and surveying the reefs and the marine life they support, counting the numbers of each species of fish and invertebrate.

The trip was organised by Biosphere Expeditions, a UK-based non-profit company that runs conservation holidays around the world, giving members of the public a chance to contribute to scientific research projects.

The divers used methods devised by US-based Reef Check, which monitors the condition of coral worldwide. Their findings will be sent to Reef Check to form part of its global figures.

Coral reefs are important as they protect coastlines and provide habitats for a wide range of other marine creatures that are vital for the health of the food chain.

Matthias Hammer, the founder and executive director of Biosphere Expeditions, said: "A lot of medicinal compounds have come out of corals, and the world's best glue is based on the glue that corals use to attach themselves to the seabed.

"Then there's the philosophical aspect - we should take guardianship of our planet, we're only a passenger here so we shouldn't abuse it, what are we handing on to our children?"

Ms Bento believes further study of Musandam's reefs could also help scientists to understand how coral develops in the Gulf.

"Musandam is important because it is the only area of water circulation that enters the Gulf," she added. "We don't know if Musandam makes any contribution to the corals inside the Gulf as new recruits could come from there.

"Or is it the other way around - where are they coming from and where are they going?"

Despite their resilience, the Gulf's reefs may not be immune in the long term to the impact of global warming.

The NSU report, called *The Most Temperature-adapted Corals have an Achilles' Heel*, warns that the special type of seabed on which the coral grows could be dissolved as the chemical composition of the Gulf changes.

This would result in a chronic habitat shortage - and even the world's hardiest coral would die off.

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