

Scientists fear mass extinction as oceans choke

By Amy Simmons

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Australian scientists fear the planet is on the brink of another mass extinction as ocean dead zones continue to grow in size and number.

More than 400 ocean dead zones - areas so low in oxygen that sea life cannot survive - have been reported by oceanographers around the world between 2000 and 2008.

That is compared with 300 in the 1990s and 120 in the 1980s.

Professor Ove Hoegh-Guldberg, of the ARC Centre of Excellence for Coral Reef Studies (CoECRS) and from the University of Queensland, says there is growing evidence that declining oxygen levels in the ocean have played a major role in at least four of the planet's five mass extinctions.

"Until recently the best hypothesis for them was a meteor strike," he said.

"So 65 million years ago they've got very good evidence ... all the dinosaurs died because of smoke and stuff in the atmosphere from a meteor strike.

"But with the four other mass extinction events, one of the best explanations now is that these periods were preceded by an increase of volcanic activity, and that volcanic activity caused a change in ocean circulation.

"Just as we are seeing at a smaller scale today, huge parts of the ocean became anoxic at depth.

"The consequence of that is that you had increased amounts of rotten egg gas, hydrogen sulfide, going up into the atmosphere, and that is thought to be what may have caused some of these other extinction events."

Professor Hoegh-Guldberg says up to 90 per cent of life has perished in previous mass extinctions and that a similar loss of life could occur in the next 100 years.

"We're already having another mass extinction due to humans wiping out life and so on, but it looks like it

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Low oxygen levels, which have been found along south-eastern Australia, are known to increase stress on fish. (Reuters: Ho New)

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could get as high as those previous events," he said.

"So it's the combination of this alteration to coastlines, climate change and everything, that has a lot of us worried we are going to drive the sixth extinction event and it will happen over the next 100 years because we are interfering with the things that keep species alive.

"Ocean ecosystems are in a lot of trouble and it all bears the hallmarks of human interference.

"We are changing the way the Earth's oceans work, shifting them to entirely new states, which we have not seen before."

He says while it is impossible to predict the future, in a century from now the world will be vastly different.

"A world without the Great Barrier Reef, where you don't have the pleasure of going to see wild places any more," he said.

"We might be able to struggle on with much lower population densities, but ultimately it won't be the world we have today.

"The idea of walking in the Daintree will be a forgotten concept because these changes have occurred."

Hearts and lungs

Scientists say ocean dead zones, which vary in size from one square kilometre to 70,000 square kilometres, have been found all over the world.

Particular hotspots include the Gulf of Mexico, off Namibia in the South Atlantic, in the Bay of Bengal, in the Baltic, the Black Sea, the tropical South Pacific, off China and south-eastern Australia.

"We're seeing an expansion of areas of the ocean which are very low in oxygen and also very low in nutrients," Professor Hoegh-Guldberg said.

"Climate change is driving changes to water circulation - so winds, strange weather patterns, have a consequence for how the ocean turns over and aerates and so on, and it's the winds which are delivering a lot of organic compounds into the deep sea.

"At the same time we are putting a lot of fertiliser off coastlines, those sorts of things are incubating these deep water anoxic zones.

"So it's the combination of those two things that are having a big change on how the ocean works."

He says organic matter building up in the sea is a huge problem.

"You get enormous amounts of organic carbon building up at depth, bacteria then likes to break down that organic matter and bacteria uses up the oxygen," he said.

"So then what you get is a substantial drop in oxygen - that then has the consequences for fishers, for the productivity of coastlines and so on."

Destructive path

Associate Professor Mark McCormick, also of CoECSR and from James Cook University, says low oxygen levels increase stress on fish.

"We know from our recent work that increases in stress result in deformities, leading to poorer survival of fish larvae," he said.

"It has also been found they can cause fish to have smaller ovaries, produce fewer eggs, so larvae are also smaller and less likely to survive."

Professor Hoegh-Guldberg says the problem is not as significant in Australia as other parts of the world, but that it is heading along the same, destructive path.

"We've been altering coastal areas, delivering nutrients into the ocean, and of course you see the Great Barrier Reef, which has been quite damaged due to nutrient run-off," he said.

"But the point is that our activities on land have a big influence on what goes on in the oceans and now we are starting to wreak the harvest of those changes."

He says the heart and lungs of the planet are being tampered with.

"We are starting to see changes in the ocean's ability to produce oxygen and to produce food and produce all of the ecosystem's services that are so important to not only us, but all of the other organisms on the planet," he said.

"It's mucking around with the heart and lungs of the planet - that's essentially what the oceans are, a huge respiratory system.

"We damage them, the consequences could be very serious."

Professor Hoegh-Guldberg says while the dead zones may only exist in pockets of ocean today, it will affect a far greater area in the future unless steps are taken to reduce the impact of human activities on the world's oceans and their life.

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