

Oceans suffocating as number of dead zones quadruples since 1950

Tenfold increase in coastal areas affected since 1950 Climate change and runoff to blame, UN study finds

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Ocean “dead zones”, where there is no oxygen left, have quadrupled in size since 1950, scientists have warned, while the number of sites near coasts with very low oxygen has multiplied tenfold.



A fisherman in Chile walks on a beach full of dead sardines after a 'red tide' algal bloom appeared off the coast. The blooms are closely linked to oceanic dead zones
Photograph: AP/
Felix Marquez

Most sea life cannot survive in these zones and the process, on current trends, will eventually lead to mass extinction, risking dire consequences for hundreds of millions of people who rely on the sea. Climate change caused by burning fossil fuels causes the large-scale deoxygenation, as warmer waters hold less oxygen. Coastal dead zones are due to fertiliser and sewage runoff.

The analysis, published in the journal *Science*, is the first comprehensive analysis of the areas. It states: “Major extinction events in Earth’s history have been associated with warm climates and oxygen-deficient oceans.”

Denise Breitburg, of the Smithsonian Environmental Research Center in the US, who led the study, said: “Under the current trajectory, that is where we would be headed. But the consequences to humans of staying on that trajectory are so dire that it is hard to imagine we would go quite that far down that path.”

Breitburg added: “This is a problem we can solve. Halting climate change requires a global effort but even local actions can help with nutrient-driven oxygen decline.”

She pointed to recoveries in Chesapeake Bay in the US and the Thames in Britain, where better farm and sewage practices led to dead zones disappearing.

However, Prof Robert Diaz, at the Virginia Institute of Marine Science, who reviewed the new study, said: “Right now, the increasing expansion of coastal dead zones and decline in open-ocean oxygen are not priority problems for governments around the world. Unfortunately, it will take severe and persistent mortality of fisheries for the seriousness of low oxygen to be realised.”

The oceans feed more than 500 million people, especially in poorer nations, and provide jobs for 350 million people. But at least 500 dead zones have now been reported near coasts, up from fewer than 50 in 1950. Lack of monitoring in many regions means the true number may be much higher.

The open ocean has naturally occurring low oxygen areas, usually off the west coast of continents, due to the way the rotation of the Earth affects ocean currents. But these zones have expanded dramatically, increasing by millions of square kilometres since 1950, roughly equivalent to the area of the European Union.

Furthermore, the level of oxygen in all ocean waters is falling, with 2% – approximately 77bn tonnes – having been lost since 1950. This can reduce growth of marine life, impair reproduction and increase disease, the scientists warn. One irony is that warmer waters not only hold less oxygen but also mean marine organisms have to breathe faster, using up oxygen more quickly.

There are also dangerous feedback mechanisms. Microbes that proliferate at very low oxygen levels produce lots of nitrous oxide, a greenhouse gas that is 300 times more potent than carbon dioxide.

Fertiliser, manure and sewage pollution along coasts cause algal blooms and when the algae decompose oxygen is sucked out of the water.

In some places, the algae can lead to more food for fish and increase catches around the dead zones. However, this may not be sustainable, according to Breitburg. “There is a lot of concern that we are really changing the way these systems function and that the overall resilience of these systems may be reduced,” she said.

The new analysis was produced by an international working group set up in 2016 under Unesco’s Intergovernmental Oceanographic Commission. Kirsten Isensee, a specialist in carbon sinks at the commission, said: “Ocean deoxygenation is taking place all over the world as a result of the human footprint, therefore we also need to address it globally.”

Lucia von Reusner, campaign director at the environmental group Mighty Earth, which recently exposed a link between the dead zone in the Gulf of Mexico and largescale meat production, said: “These dead zones will continue to expand unless the major meat companies that dominate our global agricultural system start cleaning up their supply chains to keep pollution out of our waters.”

Diaz said the pace of ocean suffocation already seen was breathtaking: “No other variable of such ecological importance to coastal ecosystems has changed so drastically in such a short period of time from human activities as dissolved oxygen.”

He said the need for urgent action was best summarised by the motto of the American Lung Association: “If you can’t breathe, nothing else matters.”