

Protect ocean against 'irreversible' changes: Experts call for eight urgent measures

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A new scientific paper co-authored by the University of Plymouth has said that eight urgent, simultaneous actions are needed to head off potential ecological disaster in the global ocean, amid signs of steeper

and faster changes than even recent models predicted.

Experts convened by the International Programme on the State of the Ocean (IPSO) warn that failure to take action in the next ten years to halt damage caused by unprecedented rates of climate heating and other human activities could result in catastrophic changes in the functioning of the global [ocean](#), threatening vital ecosystems and disrupting human civilization.

The multi-disciplinary team of marine scientists and experts in law, policy and finance, reviewed and synthesized the findings of 131 peer-reviewed [scientific papers](#) on ocean change (120 from the past five years) in order to assess changes occurring and the consequences of inaction.

The resulting assessment, published today in *Aquatic Conservation*, says diminished marine food-chain production, reduced ability to store carbon, sinking oxygen levels and the possible release of stored heat back in to the atmosphere are among a slew of changes, either underway or evidenced as possible, in a [global ocean](#) under mass assault from human activity.

Professor Jason Hall-Spencer, of the School of Biological and Marine Sciences, was one of the authors of the report and has worked pro bono as a scientific advisor to IPSO over the past year.

He said: "As a marine climate change and ocean acidification expert, my input has been to highlight that carbon dioxide emissions are not only causing mass extinctions of coral reefs due to [heat waves](#), they are also driving down the amounts of life-giving oxygen in the water and making it more corrosive to organisms with shells or skeletons, such as deep-sea coral reefs. We have brought scientific expertise developed at the University of Plymouth into the IPSO report, focused on eight urgent

actions that are needed now and in unison to halt catastrophic changes in the functioning of the ocean."

Climate breakdown impacts in the ocean are described as "pervasive and accelerating," and the pre-eminent factor driving change in the ocean. The experts say that the highest priority remains to rigorously address global heating and limit surface temperature rise to 1.5°C by 2100. However, measures should be implemented to prepare for a 2-3 degree centigrade temperature rise.

The call for a precautionary moratorium on deep-sea mining comes as the International Seabed Authority holds its annual meeting amid mounting concern that mining activity could disrupt carbon stores in seafloor sediments, reducing the ocean's ability to absorb carbon dioxide and mitigate the effects of the climate emergency. Twenty nine exploration licenses have been granted so far and the area of commercial interest for mining activity is estimated at over four million square kilometers larger than the total landmass of the top 20 EU countries.

The other priorities are:

- secure a robust, comprehensive High Seas Treaty with a Conference of Parties and a Scientific Committee; and reformed voting rights on bodies such as the International Seabed Authority to stop vested interests undermining the precautionary approach.
- enforce existing standards for effective marine protected areas (MPAs), and in particular fully-protected marine reserves, and extend their scope to fully protect at least 30% of the ocean, including representation of all habitats and the high seas, while ensuring effective management to prevent significant adverse effects for 100% of the rest of the ocean.
- end overfishing and destructive practices including illegal,

- unreported and unregulated (IUU) fishing.
- radically reduce marine water pollution, including nitrogen fertilizers and sewage as well as plastics.
- provide a financing mechanism for ocean management and protection; and tax unsustainable activities to remove costs to the global commons and fund innovation and adaptation.
- scale-up scientific research on the ocean and increase transparency and accessibility of ocean data from all sources (i.e. science, government, industry). Increasing the understanding of heat absorption and heat release from the sea to the atmosphere should be a research priority. The UN Decade of Ocean Science beginning in 2021 is a key opportunity to achieve this step change.

"We have taken a solutions based approach to allow greater communication with decision-makers and the public," added Professor Hall-Spencer, of the report. "It is abundantly clear that the time has now come to build resilience in coastal waters, for example by rapidly reigning in on damaging fishing practices, to restore ocean health. We also must not ignore international commitments that come into force in 2020 such as the Paris Climate Agreement, the United Nations Treaty on biodiversity protection on the High Seas and the ocean Sustainable Development Goals such as an urgent need to reduce ocean acidification."

The IPSO paper highlights a number of worrying trends emerging from the latest scientific research which indicate ocean change is occurring at a much faster and deeper rate than projected. These include:

- ocean warming is accelerating, heating up 40 percent faster on average than a United Nations panel estimated five years ago
- upper-ocean warming, a consequence of anthropogenic global warming, is changing the global wave climate, making waves

stronger

- signs that the ocean might be starting to release some of that stored thermal energy which could contribute to significant global temperature increases in the coming years
- an alarming trend of declining [oxygen levels](#) in the ocean which combined with chemical pollutants is turning huge areas hypoxic or anoxic
- Arctic and Antarctic ice is melting faster than scientists anticipated, and the subsequent sea-level rise bringing catastrophic consequences for cities around the world.

The IPSO paper comes ahead of the Intergovernmental Panel on Climate Change's first ever report solely focused on the state of the ocean and cryosphere due in September 2019, and a UN Climate COP in December expected to focus on the importance of the ocean within the climate emergency.

Lead Author Professor Dan Laffoley, of the International Union for Conservation of Nature (IUCN), said: "Marine life is threatened with suffocation, starvation, overheating and acid corrosion under current climate impacts. The situation is only getting worse. We need to act on [climate](#) change but also, urgently build resilience. All life on Earth is at risk from ocean collapse. This paper sets out eight practical, but ambitious steps that need to be implemented simultaneously in order to help prevent that."

Provided by University of Plymouth

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