

Scientists call for better management of the deep sea

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The deep sea is in trouble. A recent study has found that it's being damaged by human activities, and that this is only likely to get worse. Scientists are now calling for better management and conservation of entire deep-sea ecosystems.

It's so 'out of sight, out of mind' that people have used the deep sea as a dumping ground for hundreds of years. While this is still a problem, the report's authors say that the deep sea's most pressing threat now comes from exploitation and the [effects of climate change](#).

The deep sea – classed as waters deeper than 200 metres – covers 360 million square kilometres and makes up around half of the Earth's surface, making it the largest environment and last great wilderness on Earth. Depths average nearly four kilometres, but reach almost 11

kilometres at the deepest trench on Earth, the Marianas Trench.

It's an understudied, alien world. But far from being devoid of life, it's teeming with unusual creatures that can survive the darkness and immense pressures. It's also full of valuable resources: fish, minerals, and – under the seafloor – oil and gas. This makes it particularly prone to exploitation.

But how exactly do our activities affect the deep sea?

"It's a difficult question to answer, because we know comparatively little about it," says Professor Paul Tyler from the National Oceanography Centre, Southampton, co-author of the study, published in *PLoS One* this month. "But during scientific trawls back in the 80s, it wasn't uncommon to bring up oil drums, and that's just in one small area."

In an attempt to answer this question, a team of 20 researchers from countries all over the world gathered for a workshop as part of the 10-year Census of Marine Life (COML) initiative. The COML project's aim was to assess and explain the diversity, distribution, and abundance of life in the oceans.

The scientists analysed the past, present and future effects of human activities on deep-sea habitats, focussing specifically on disposal, exploitation, and climate change - including ocean acidification.

"People often think of the deep sea as 'the big, wet bit out there.' But it's a big series of ecosystems. You get valleys, mountains, volcanoes and plains on land; it's the same variation in the deep sea, plus the water," says Tyler.

Dumping waste used to be the biggest problem: plastic, glass and metal are the most common types of litter found on the deep-sea floor.

"Between 1973 and 1978, more than 387,000 tonnes of pharmaceutical waste was dumped in the Puerto Rico Trench. This is equivalent to 880 Boeing 747s," write the researchers.

While disposing of some waste like sewage, pharmaceuticals and low-level radioactive material in the sea is now banned, the dumped waste stays on the sea floor, so it remains a problem.

Right now, exploitation is the number one problem for the deep sea. Technological developments let us exploit the deep sea's mineral wealth, prospect for oil and gas, and harvest vast quantities of fish.

Together with climate change, this means the region is facing, 'large and accelerating challenges.' But as this century goes on, Tyler and his co-authors say that climate change will overtake exploitation as the most damaging activity.

Climate change will make our oceans more acidic, which could cause problems for corals and creatures with chalky skeletons like starfishes, sea urchins and sea cucumbers. "Today's climate change is happening so quickly that evolutionary change is struggling to keep up," the authors say.

One of the barriers to better management of the deep sea is that activities like dumping waste, fishing and [climate change](#) are altering the deep sea much quicker than scientists can study it.

"One of the main problems that continue to cause concern is that the fastest movers in the [deep sea](#) are those who want to use it as a service provider,' says Tyler. 'Lagging behind somewhat are the scientists, managers and legislators."

"You could argue that legislation should come first, then science, then

exploitation.'

The scientists conclude: "The implementation of regulatory measures in the high seas - 64 per cent of the global ocean - requires a review and changes to the existing UNCLOS legislation to provide wider protection." The United Nations Convention on the Law of the Sea (UNCLOS) is an agreement that defines the rights and responsibilities of nations in their use of the world's oceans.

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