

The world's coral reefs are bleaching. What does that mean?

LONDON(Reuters) - Huge stretches of coral reef around the world are turning a ghostly white this year amid record warm ocean temperatures. On Monday, the U.S. National Oceanic and Atmospheric Administration confirmed the world's fourth mass global bleaching event is underway - with serious consequences for marine life and for the people and economies that rely on reefs. Here's how warming affects coral reefs and what the future might hold for these fragile underwater ecosystems.

WHAT ARE CORALS?

Corals are invertebrates that live in colonies. Their calcium carbonate secretions form hard and protective scaffolding that serves as a home to many colorful species of single-celled algae. The two organisms have evolved over millennia to work together, with corals providing shelter to algae, while the algae remove coral waste compounds and deliver energy and oxygen back to their hosts.

WHY DO CORALS MATTER?

Coral reefs cover less than one percent of the ocean floor, but have outsized benefits for marine ecosystems and economies. A quarter of marine life will depend on reefs for shelter, finding food or spawning at some point in their lives and coastal fisheries would struggle without corals.

Every year, reefs provide about \$2.7 trillion in goods and services, from tourism to coastal protection, according to a 2020 estimate by the Global Coral Reef Monitoring Network. About \$36 billion is generated by snorkeling and scuba diving tourists alone.

Coral reefs also help coastal communities by forming a protective barrier against storm surges and large waves. This helps to avoid property damage for more than 5 million people worldwide, a 2022 study in the journal *Marine Policy* found.

WHAT IS CORAL BLEACHING?

When water temperatures rise, jewel-toned corals get stressed. They cope by expelling their algae — causing them to turn bone white. Most corals live in shallow waters, where climate-driven warming is most pronounced. Whether a coral becomes heat-stressed depends on how long the high temperatures last, and how much warmer they are than usual.

Scientists have found that corals generally begin to bleach when surrounding waters are at least 1 degree Celsius warmer than the maximum average temperature - or the peak of what corals are used to - and persist for four or more weeks.

DO ALL BLEACHED CORALS DIE?

Corals can survive a bleaching event if the surrounding waters cool and algae return. Scientists at the Palau International Coral Reef Center estimate that it takes at least nine to 12 years for coral reefs to fully recover from mass bleaching events, according to research published in 2019.

Disruptions such as cyclones or pollution can slow the recovery. "Bleaching is like a fever in humans," said ecologist David Obura, director of Coastal Oceans Research and Development in the Indian Ocean East Africa. "We get a fever to resist a disease, and if the disease is not too much, we recover. But if it is too much, we die as a result."

WHAT CAN BE DONE TO HELP SAVE REEFS?

The best chance for coral survival is for the world to cut greenhouse gas emissions to limit climate change. Many scientists think that at just 1.2C of warming above preindustrial level, the world has already passed a key threshold for coral reef survival. They expect between 70% and 90% of the world's coral reefs will be lost.

Scientists and conservationists are scrambling to intervene. Local communities have cleanup programs to remove litter from the reefs to reduce further stresses. And scientists are breeding corals in labs with the hopes of restoring degraded reefs. However, none of this is likely to work to protect today's corals from warming waters. Scientists are therefore trying to plan for the future by bringing coral larvae into cryopreservation banks, and breeding corals with more resilient traits.