TAKE ACTION

In order to prevent negative effects from ocean acidification and habitat destruction from bottom trawling, we need your help.

Protect deep-sea corals from bottom trawling by contacting the National Oceanic and Atmospheric Administration (NOAA) at bill.hogarth@noaa.gov. They, along with the Regional Fisheries Management Councils, must exercise their authority by exploring for and protecting deep-sea corals.

Support climate legislation to substantially decrease CO_2 emissions, mitigating the effects CO_2 will have on the oceans.

In order to better understand the problem and the potential consequences of ocean acidification, support legislation and funding for ocean research and monitoring programs.

It's time to make a difference; join the Oceana WaveMakers at www.oceana.org and tell the decision makers that the time to act to protect the oceans is NOW.

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OCEANA campaigns to protect and restore the world's oceans. Our teams of marine scientists, economists, lawyers and advocates win specific and concrete policy changes to reduce pollution and to prevent the irreversible collapse of fish populations, marine mammals and other sea life. Global in scope and dedicated to conservation, Oceana has campaigners based in North America, Europe and South America. More than 300,000 members and e-activists in over 150 countries have already joined Oceana. For more information, please visit www.oceana.org.

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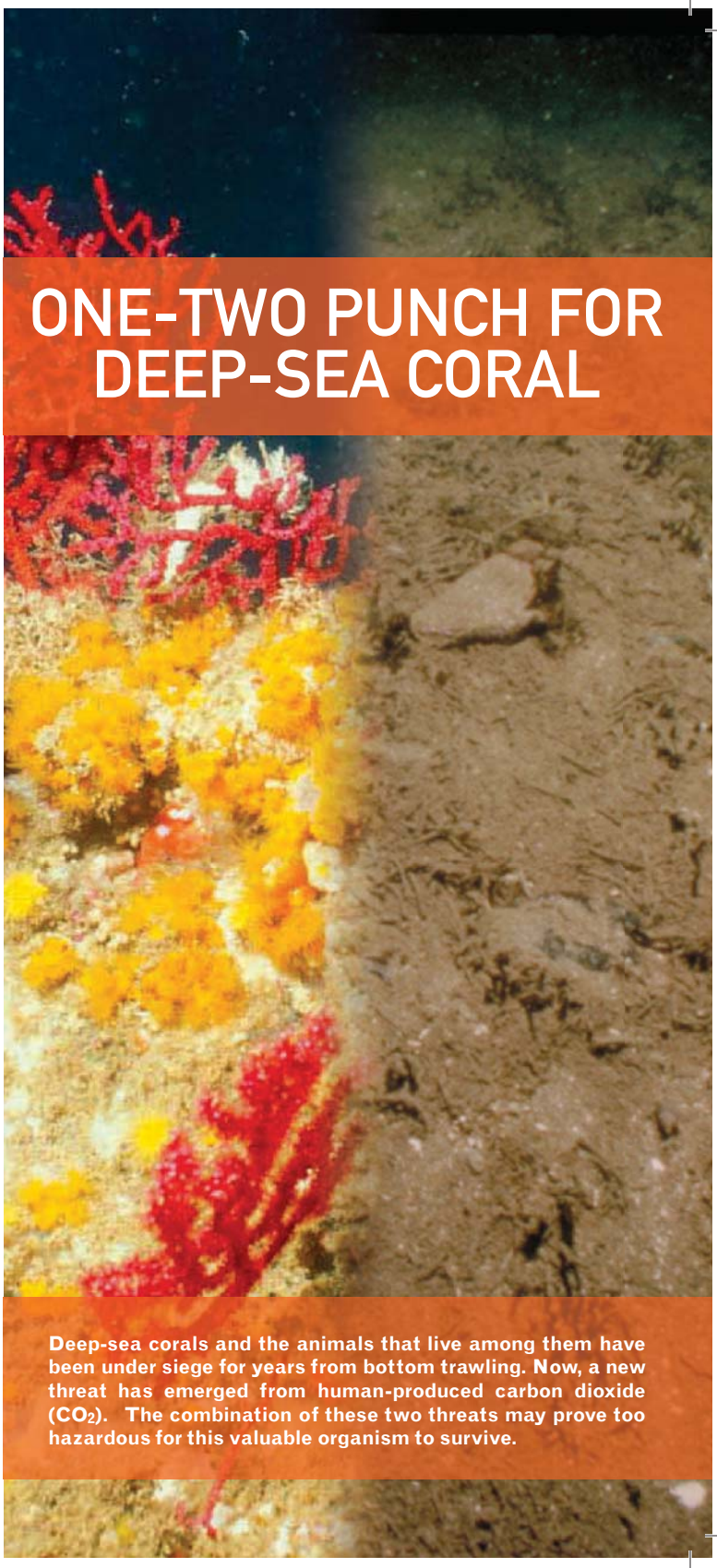

ONE-TWO PUNCH FOR DEEP-SEA CORAL

Deep-sea corals and the animals that live among them have been under siege for years from bottom trawling. Now, a new threat has emerged from human-produced carbon dioxide (CO_2). The combination of these two threats may prove too hazardous for this valuable organism to survive.

Deep-sea Corals: Important and Extraordinary

Deep-sea corals are important for providing a deep-water habitat for thousands of marine organisms. They serve as nurseries for young fish, provide protection from predators and currents, and supply areas for feeding and reproduction. This environment draws in a large number of fish and other ocean creatures. While many people are aware of tropical corals and the abundant life they harbor, few individuals realize the biological diversity cold-water corals provide. Two-thirds of all known coral species live in cold-water habitats.

Diversity is not the only impressive feature of deep-sea corals. These corals can inhabit depths hundreds to thousands of feet beneath the ocean's surface, surviving temperatures as cold as 30° F. Deep-ocean corals can live hundreds or even thousands of years. In fact, deep-sea ivory tree coral lives to 1,500 years old.

Deep-ocean corals are more than just fish habitat with extraordinary characteristics. They also provide a potential source for pharmaceuticals. Knowledge of deep-sea corals is limited but enormous potential for new discoveries and understanding of their importance does exist. They must be explored, protected and understood before it is too late to ensure their future survival. These corals may hold enormous potential both for restoring the ocean and for protecting human life.

Bottom Trawling

Deep-sea coral ecosystems are targeted by fishermen in search of long-lived, valuable fish. Fishermen use a technique called bottom trawling to catch the fish. This method is extremely harmful as the gear catches far more than fish, scooping up everything on the ocean floor while destroying irreplaceable habitat. Anything in the trawl's path such as unwanted fish, mammals, sea turtles and deep-sea corals are bulldozed into the net. This is especially destructive to the slow-growing deep-sea corals that can take decades, if not centuries to recover.

According to a study by the National Academy of Sciences, over the past decade, trawling has directly affected about 231,000 square miles of seafloor habitat off the coast of the United States—an area greater than California.

"**Bottom trawling is the most widespread human threat to deep-sea coral communities." –** Dr. Michael Hirshfield and Santi Roberts, *Frontiers in Ecology and the Environment*

Illustration of bottom trawling © Joe Schulack

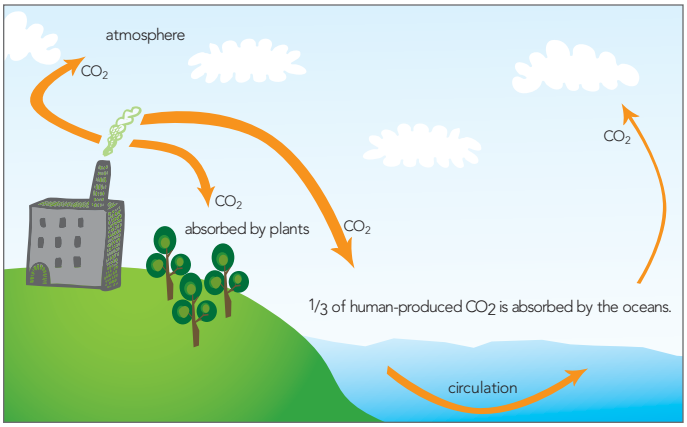

Illustration of Carbon Cycle © OCEANA | Jaela Grayson

Ocean Acidification

Human-produced CO_2 is a major contributor to climate change. The United States is the largest CO_2 emitter in the world. While a significant amount remains in the atmosphere, approximately one-third of human-caused CO_2 ends up in the ocean. When CO_2 levels in the ocean increase, the pH level of the water decreases, making the water more acidic. Increasingly acidic conditions inhibit certain organisms, such as corals and oysters, from producing important body structures like skeletons and protective shells.

Deep-sea corals are a marine organism that could be dramatically affected by more acidic ocean waters as CO_2 deposition increases. As acidity rises, mineral concentrations needed for coral growth diminishes. The result is that coral calcifying structures grow slower, become weaker and even dissolve. The effect is comparable to osteoporosis in humans, which leads to poor skeletal development. As carbon emissions continue along the "business-as-usual" scenario, which is four times pre-industrial levels (788 parts per million by 2100), the critical mineral concentration required to form deep-ocean corals will precipitously decline.

While ocean acidification is a threat to all corals, deep-sea corals are likely to be the first coral ecosystem to experience its effects. Due to increasingly acidic water, the mineral levels necessary to form corals will start decreasing from the bottom of the ocean and continue towards the surface. Since the 1800s, the depth that contains the amounts of essential minerals for calcification has risen between 50 to 200 meters. It is predicted that by 2100 only 30 percent of cold-water corals will reside at locations with sufficient mineral concentrations for survival. To learn more about ocean acidification, please visit www.oceana.org/climate-change.

A Deadly Combo

When taken separately, both ocean acidification and bottom trawling are extremely harmful to deep-sea corals. However, when these effects are combined, the threat to deep-sea corals could be a deadly and irreversible one-two punch.

"First, bottom trawlers smash them to bits. Then, ocean acidification will probably slow the skeletal growth and/or lead to weaker skeletons of those that remain." – John Guinotte, a marine biogeographer at the Marine Conservation Biology Institute