

### Coral Reefs: A Home On the Brink of Extinction

Often called the rainforest of the sea, coral reefs act as a home for some of the most diverse life on the planet. It harbors organisms in all forms, ranging from microscopic to large, soft to hard, those with eyes, and those without, for example. Reefs are so rich and varied in life, that they contain upwards of two million species (Painting, 2011). It is the composition of these millions of organisms that make coral reefs the absolute most diverse ecosystem on earth. With no outside factors, reefs act as one of the best naturally self-sustaining cycles known to man. However, it is man that is causing a great deal of disturbance in the flow of this biosphere. Reefs are disappearing in our waters, which is directly impacting millions of organisms. When faced with external challenges, animals are to either migrate, adapt, or die. Since these coral reefs are a home for millions of animals, most of them will cease to exist. In terms of coral, the external factor is human-beings.

The National Oceanic and Atmospheric Administration Coral Reef Conservation Program (NOAA CRCP, 2009) has boiled the extinction of the coral reefs down to three main causes, or “impacts”. They are climate change, fishing, and land-based pollution (“Coral Reef Conservation Program Goals and Objectives 2010-2015”, 2009). What is most shocking, or perhaps the least, is the fact that all three of these impacts can be

traced back to anthropogenic activity. Coral provides us with around \$30 billion dollars every year. Tourism, fishing, and aesthetics/decorations can account for most of that, but coral provides humans with more than just money. Reefs are used as a natural defense system against coastal dangers such as waves and storms, and provides us with a place to study an ecosystem that flourishes in biodiversity (World Meteorology Organization, 2010). Coral is a vital resource to not just marine life, but for humans as well. Even with all of these benefits, we continue to destroy these organisms in the pursuit of easier living.

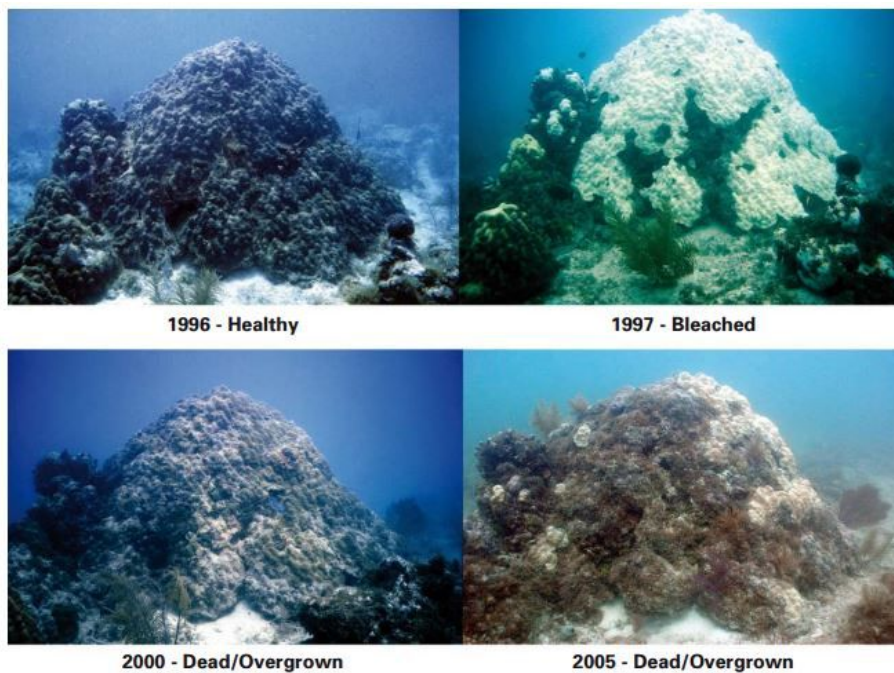
Climate change has gradually risen temperatures within our atmosphere, which directly impacts the temperatures of our waters. Rising water temperatures is causing what is known as coral bleaching. Coral bleaching is when coral reefs lose their signature, naturally vivid color due to a raise in ocean temperature. To further understand how exactly coral bleaching works, one must understand the relationship



between zooxanthellae, and the coral polyp. What makes up most of a coral reef is the coral polyp, which has the anatomy similar to that of a sea anemone. The coral polyp obtains a large portion of its energy from an algae-like organism called zooxanthellae. This relationship works because the algae lives in the skin tissue of the coral polyp,

*Example of a coral polyp Source: Darwin's Reef Explorers*

providing it with energy while the polyp gives protection and nutrients to the zooxanthellae. Since the zooxanthellae reside in the skin, it gives the coral polyp its signature color (Painting, 2011). When water temperatures increase however, this symbiotic cycle breaks down, and as a result, the polyp releases the zooxanthellae from their cells, thus causing the coral to turn white and have that “bleaching” effect. Living in these gradually warming waters combined with the fact that most coral live in a habitat that is close to their “upper thermal tolerance limit” (threshold for temperatures that organisms can survive in), is what is causing such widespread coral bleaching and death (Hannah, Lee, Lovejoy, Thomas, 2012). With the death of these creatures, comes along with the death of the millions of diverse organisms that rely on coral for shelter and survival. Take this problem, and put it on a global perspective, and you have a massive extinction of the most varied biosphere on the planet.



*Before and after coral bleaching. Source: WMO*

Fish are arguably the most important food source. Since the dawn of time, humans have taken advantage of their abundance, and some cultures, mainly those of islands and coasts, are based purely upon the existence of these aquatic creatures. Fish provide humans with protein, industry, and sport, making them an incredibly valuable resource for not just us, but for many other kinds of animals. Because of our tendency to overexploit virtually every resource that has been made available to us, overfishing has become one of the many results. For example, the amount of fish caught in the tropics from 1970 to 2008 has drastically risen from 5 megatons to 17 (WMO, 2010). Overfishing and the methods by which fishermen go about it, on top of anthropogenic environmental stressors, have caused many devastating effects on coral reefs. Fishing equipment, methods, and bycatch are the primary destroyers of coral (NOAA CRCP, 2009). One commonly used practice of catching fish is something called bottom trawling. Bottom trawling is a method in which a massive net with heavy weights attached to it scrapes the bottom of the ocean to catch large amounts of fish. With this procedure, the weights have a tendency to destroy anything in its path, since it is dragged along by the force of an industrial fishing boat. Of course a huge victim to this technique is coral, as it has the inability to dodge such a large net, causing it to be crushed and ripped from its foundation. A more violent approach to fishing includes the use of poison and explosives. In some areas, fisherman use poisons such as cyanide to kill mass groups of fish, causing them to float to the surface for easy pickings. As you can imagine, coral receives a detrimental blow due to this practice, as cyanide kills

almost every organism it comes in contact with. Explosives do the same, except they leave massive holes in the sea floor which annihilates anything in its path, mainly coral that resides where these explosives are detonated (“Destructive Fishing Practices and Bycatch”, n.d.). These tactics are exemplary of how coral is being abolished by the careless fishing industry, another driver of their extinction brought on by humanity.



*Reef's being destroyed by harmful fishing methods. Source: [oceanworld.tamu.edu](http://oceanworld.tamu.edu)*

Pollution brought on by human growth has also played a role in the coral reef's vanishment from the oceans. Alone, up to 22% of coral reefs are directly impacted by land-based pollution, and 30% are affected by coastal development (NOAA CRCP, 2009). Other specific causes of declining coral populations due to human growth are anthropogenic alterations to watersheds, pollutants such as sewage, pesticides, sediments, “atmospheric deposition into coastal waters”, and other forms of infected

waters (NOAA CRCP, 2009). These foreign toxins kill the coral, as the coral's biochemistry cannot withstand the powerful blend of human-made substance. When the coral dies, the life it harbors dies along with it, as they as well cannot withstand the force of human byproducts.

Coral reefs are home to a superabundance of the most diverse forms of life on our planet. While they do act as a home for many organisms, they also serve a much larger purpose. They benefit humans in countless ways. Reefs provide us with protection from the unpredictable nature of the sea, they give revenue to local and large economies, and coral also allows us to study biodiversity. However, recent trends by human growth and industrialization have brought about the near extinction of one of nature's most amazing gifts. This has been done by climate change, dangerous fishing techniques, and human-caused pollution. Mankind's rise to the most dominant species on earth has left other animals to suffer from our ways. Our disregard for the lives of millions of other forms of life has led them to a point where they may not survive unless we change our destructive habits. Coral reefs are one but many animals that need our immediate help to keep thriving on this diverse planet of ours.

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### Image Sources

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