



This coral reef ecosystem is home to a huge number of different species.

The Amazing Variety of Life in a Coral Reef

The reef is a carnival of colors and shapes. There are corals shaped like antlers, brains, fans, and chimneys, and many others in shapes too strange to describe. Fish dart in all directions, flashing their brilliant colors, as reef sharks loom overhead. Hiding among the corals are crabs, eels, and other animals. Coral reef ecosystems like this one are home to millions of different species. (A species is a group of organisms of the same kind.) Counting the number of different species in an ecosystem is a way to measure its biodiversity—the variety of life there. Coral reefs have greater biodiversity than almost any other ecosystems on Earth.

Greater biodiversity makes an ecosystem more stable. An ecosystem is a complex system of

interacting populations, with organisms from consumer populations eating organisms from resource populations. In a stable ecosystem, each population stays about the same size—populations are not exploding in size or completely dying out. An ecosystem with more biodiversity is more stable because a change to one population will only cause small changes to the other populations in the ecosystem, and eventually the populations will become stable again.

In an ecosystem with lots of species, such as a coral reef, there are many consumer populations and many resource populations. One consumer population may have many different resource populations. For example, a

population of reef sharks may eat parrotfish, grouper, eels, octopuses, and several other animals. If the parrotfish population decreases, that will affect the shark population, too. However, the sharks might be able to make up the difference by eating more grouper, eels, and octopuses. Because of this, the effect on the shark population will be smaller than it would have been if the sharks *only* ate parrotfish. In any ecosystem, populations are likely to have small changes over time. Still, in an ecosystem with plenty of biodiversity, the ecosystem tends to remain stable overall.

While biodiversity helps ecosystems remain stable, it's not always enough. Even though coral reefs are some of the most diverse ecosystems on Earth, they can be pushed out of balance if they are put under too much stress. Unfortunately, many different human activities are putting stress on coral reefs. Pollution from cities, factories, and farms can harm organisms and prevent needed sunlight from reaching coral reefs. Overfishing can decrease

populations of fish that play important roles in reef ecosystems. Careless tourists may step on delicate corals and break them. The greatest threat to reefs is the rising temperature and acidity of ocean water due to climate change. Faced by these threats from human activities, coral reefs all over the world are beginning to lose some of their amazing biodiversity.

Many people are trying to help maintain the biodiversity of coral reef ecosystems. In addition to working on problems like climate change, pollution, and overfishing, scientists have created coral nurseries. They collect bits of living coral that boats or storms have broken off from a healthy reef, and they let the coral grow in protected areas. Then they take those coral bits and attach them to a damaged reef, hoping the coral will reproduce and spread. In this way, scientists can try to bring back coral species that have been lost in a particular reef ecosystem. Human activities often have negative impacts on biodiversity, but humans can also have positive impacts on biodiversity.



This scientist is studying bits of coral in a coral nursery. At a coral nursery, people care for broken-off bits of living coral before getting ready to attach them to new places on a reef.