

# Coral Reefs

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# Coral Reefs

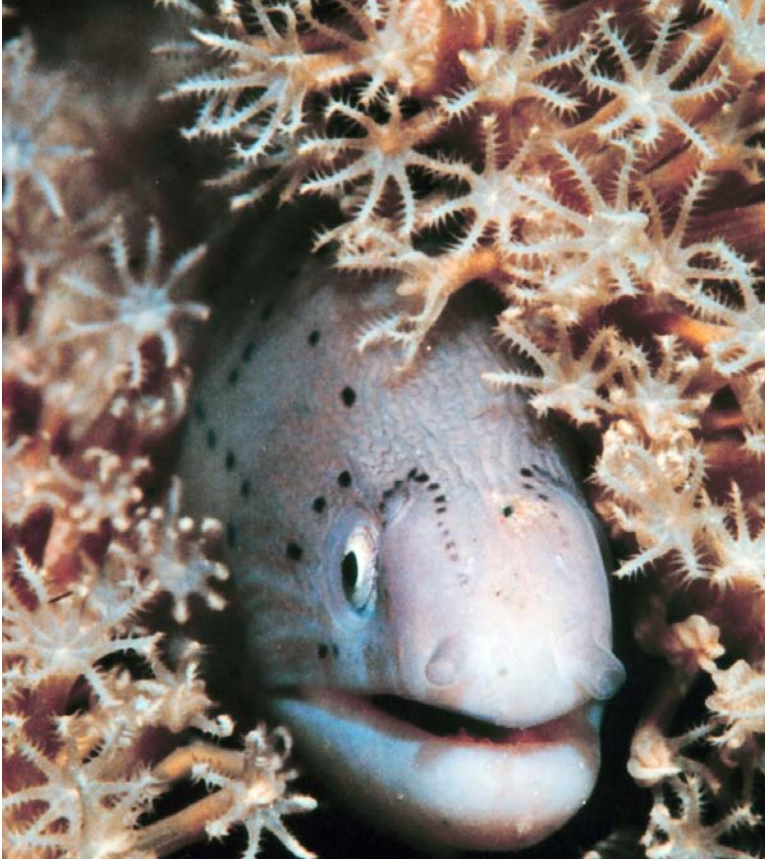


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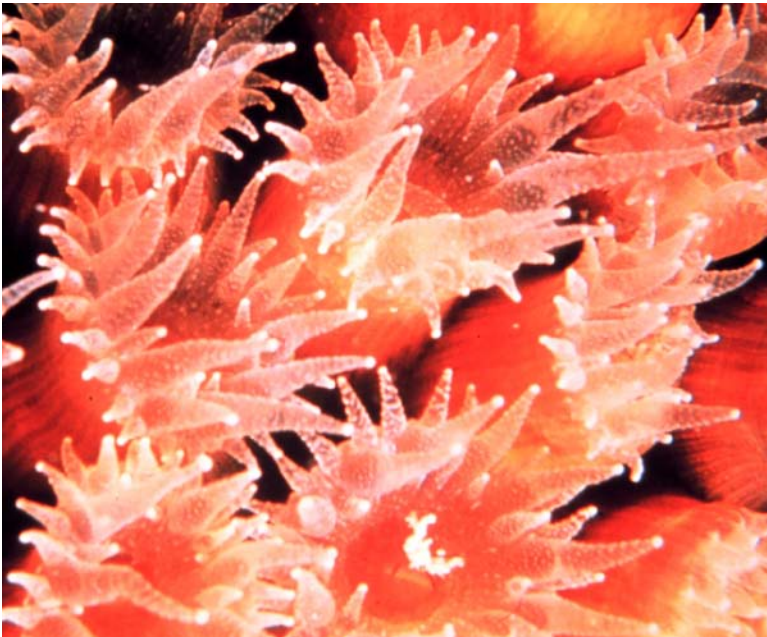
Many kinds of coral, fish, and sea creatures live in a reef.

## Introduction

Coral reefs are massive undersea communities that are home to thousands of living organisms. A reef can be hundreds of miles long. The “buildings” of this community are made up of many types and shapes of corals. Day and night, thousands of animal inhabitants bustle about, hunting, eating, and avoiding being eaten. Almost one-quarter of all the plants and animals in the ocean live around coral reefs. That’s over 4,000 kinds of fish and 700 kinds of coral that make reefs their home.

## What Is Coral?

The many corals that form the reefs may appear at first glance to be oddly shaped rocks or spiny plants. Corals are actually groups of tiny animals called **polyps** (PAH-lips). Most polyps are very small—between the size of a pinhead and the size of a pea. One branch or mound of coral can have thousands of these tiny, pea-sized polyps attached to it. Each polyp has a sac-like body and a mouth that is surrounded by tiny tentacles. Polyps are eating machines. At night, they extend their tentacles, like arms and hands, to catch tiny animals and nutrients they need.



Polyps open their tentacles only at night.



These feathery polyps form branches.

There are hundreds of kinds of corals. Most of them are divided into two main types: hard, or “stony,” corals and soft corals. Stony coral polyps form hard skeletons. When the outer polyps die, their hard skeletons remain. Over time, the accumulation of millions of these hard skeletons helps to build a reef. Most kinds of stony corals live together with various species of plants called algae (AL-jee). The many types of algae help to supply food for the coral and for many of the fish that live around the reef.



Soft corals grow flexible, woody cores instead of the hard skeletons that stony corals have. Soft corals are able to bend with the tides. Some kinds of soft coral are poisonous and will sting if touched. Others, like the sea pen coral, will collapse and hide in the sand if they are approached.



(Left) A sea fan (a soft coral); (right) a brain coral (a stony coral)

Corals are often named after what they resemble. Stony corals include brain corals, which look like brains, and elkhorn corals, which look like the broad horns of an elk. Soft corals often look like trees or other plants. Soft sea whips and sea pens have long, narrow branches covered with polyps. Sea whip polyps are about one quarter-inch long with eight tentacles each. The tentacles catch tiny animals and fish. Sea fan corals are wide and branching—like a fan. Their expansive shape traps bits of **plankton** to eat as they drift by.



Elkhorn coral branches out as an elk's horns do.

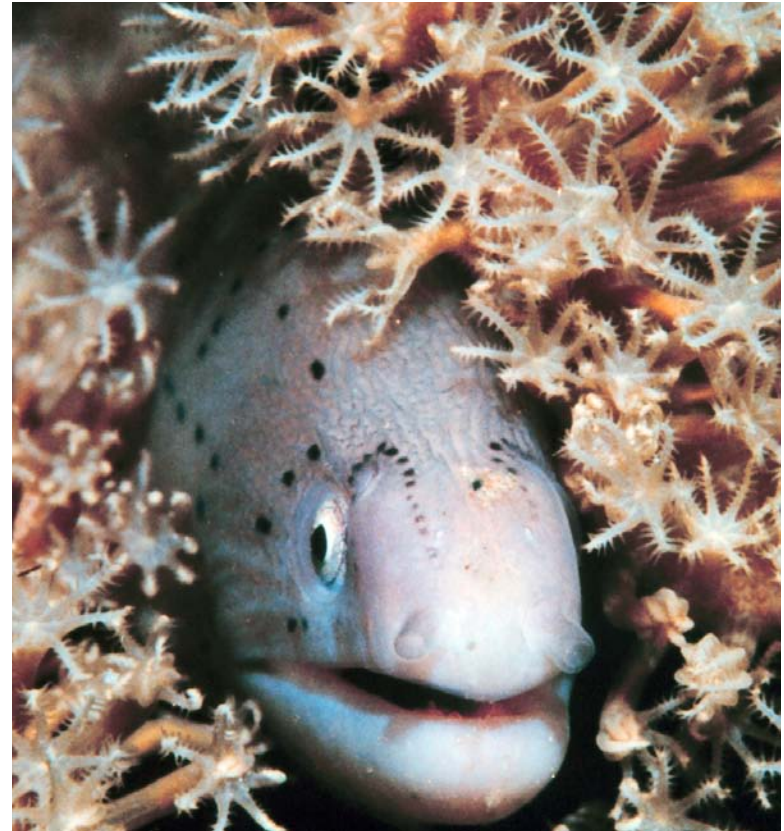




Schools of brightly colored fish are common on reefs.

### **A Busy Underwater Community**

Most people think of brightly colored fish when they think about coral reefs—and with good reason. Thousands of fish, from large sharks to the tiny goby, inhabit reefs. They depend on the reef for food and for protection from becoming food themselves. Some fish live off the algae and plankton around the reef, and some eat other fish that live there. A few types of fish even eat the coral itself.



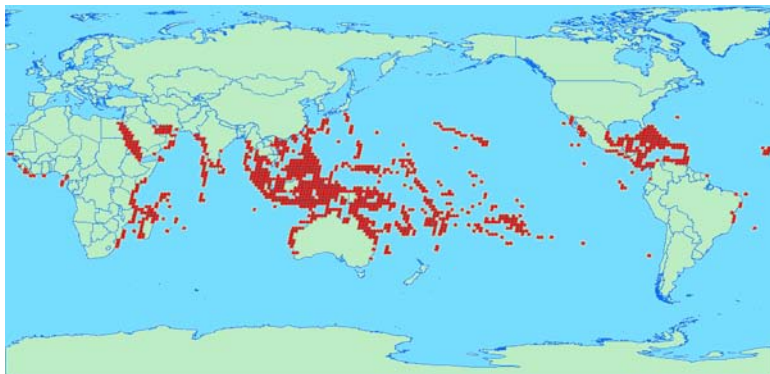
Reefs offer many good hiding places for animals such as this moray eel.

**Crustaceans** such as shrimp, lobsters, and crabs also prefer reefs as a favorite eating spot. Sea urchins and starfish catch clams and smaller shellfish hidden among the coral branches. Waving sea anemones, which look like graceful flowers, hide in shallow **crevices** of the reef to wait for their food to drift past. Large holes in the reef make good homes and hiding spots for moray eels. No space is wasted on a bustling reef.

## Where Do Corals Live?

Most reefs are located close to shore in warm tropical waters. They can also grow where warm currents flow from the tropics, such as in Florida and southern Japan. Coral grows best in warm water that is between 21 and 29 degrees Celsius (70–85° F).

Since algae need sunlight to make food, most corals must live near the surface of the water. A few colonies of deep, or cold-water, coral have been found at depths from 900 to 1,800 meters (3,000 to 6,000 ft). These individual coral patches don't form long reefs but they do provide shelter for many different types of fish. Since algae cannot grow at depths where light is limited, the deepwater corals feed on other organisms.



The dark areas of the map show the location of coral reefs.



Sediment and pollution from the Mississippi River enters the Gulf of Mexico.

Besides needing the right depth and temperature to thrive, coral reefs are sensitive and cannot survive in many areas because of environmental conditions. They do not grow well near the mouths of rivers, where dirt, debris, and freshwater **runoff** flow into the sea. Fresh water can kill coral. Dirt and debris can cause serious physical damage to reefs. Dirt and excess salt can also interfere with corals' food source. Reefs can be smothered by dirt or invading plant life. Large, violent waves, such as those caused by a **tsunami** (sue-NAH-mee), can even break reefs. If a powerful tsunami strikes an area, thousands of years of coral growth can be destroyed in just a few hours by the force of the wave surges.



As corals are very slow growing, a reef takes a long time to expand its size or to recover from damage. Stony corals, such as brain corals, grow the slowest. They add only 5 to 25 millimeters (0.2–1 in) of skeleton per year. Most reefs are between 5,000 and 10,000 years old. Some living coral reefs began growing almost 50 million years ago.

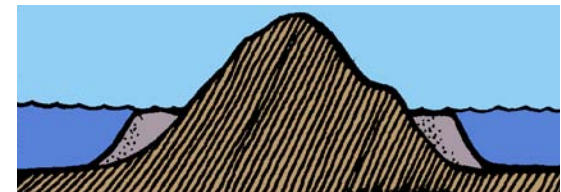


Large brain corals can be thousands of years old.

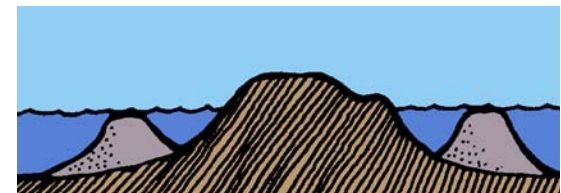
There are three types of coral reefs: **fringing reefs**, **barrier reefs**, and **atolls**. Fringing reefs are located close to the shore. They usually follow the natural shoreline, or fringe, of the land. Fringing reefs are common in Hawaii and parts of the Caribbean.

Barrier reefs have a larger **lagoon**, or area of water, between the reef and the shore. The largest barrier reef in the world is the Great Barrier Reef in Australia. It is 2,000 kilometers (over 1,242 mi) long. It is made up of over 3,000 individual reefs and islands and is home to nearly 2,000 types of fish. The Great Barrier Reef is the only living structure large enough to be seen by an astronaut standing on the moon. Its oldest sections are millions of years old. Most of the modern Great Barrier Reef ranges in age from 6,000 to 500,000 years old.

Cross section  
of a fringing  
reef



Cross section  
of a barrier  
reef





Cross section of an atoll



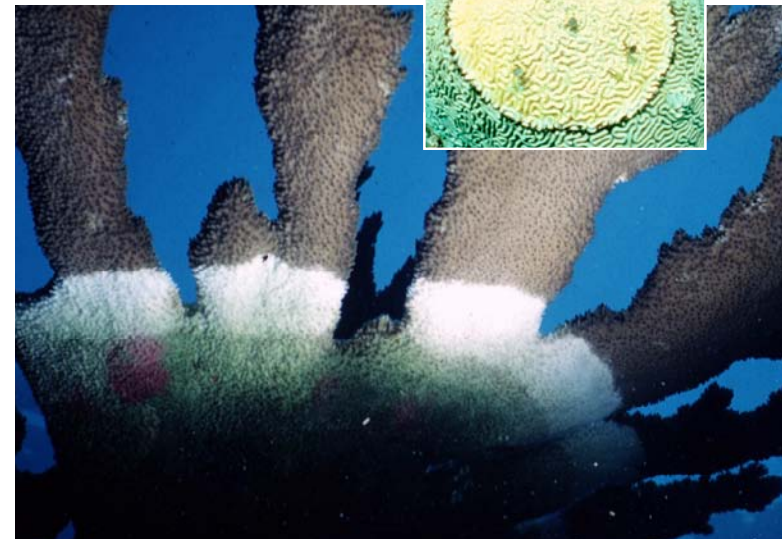
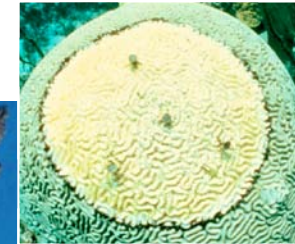
Aerial view of an atoll

An atoll is a type of reef that forms in a circular pattern around a sinking island or an aging island volcano. As the island ages and sinks, or as the volcano continues to erupt and break apart, the remaining land eventually disappears beneath the ocean's surface. When that happens, the growing reef forms a circle around a central lagoon. The largest atoll, in the western Pacific, has a lagoon that measures over 97 kilometers (60 mi) across.

## Threats to Coral Reefs

Coral reefs are very fragile, and many things can damage them. The two things that cause the most damage are disease and humans. Some conditions, such as white band and black band diseases, are caused by a combination of destructive bacteria. In most cases, the band of bacteria advances up the branch of the coral, destroying the coral polyps and leaving the skeleton behind. The skeleton can then be attacked or colonized by other damaging organisms. These fast-growing diseases can wipe out an ancient coral reef in weeks.

A dark ring resulting from black band disease



White band disease can destroy coral quickly.

Another condition, known as **bleaching**, occurs when something—usually bacteria—attacks algae, the coral’s main source of nutrients. Normally, algae live in the tissues of the coral and provide a constant source of food. Their presence even colors the coral polyps. If the coral senses that the algae have become infected, it expels them. By losing the algae, the coral polyps lose their main source of food as well as their color. They begin to starve, and without their coloration they become transparent, making their skeletons visible. The white skeleton makes them look “bleached.”



The white area of this coral has been bleached.



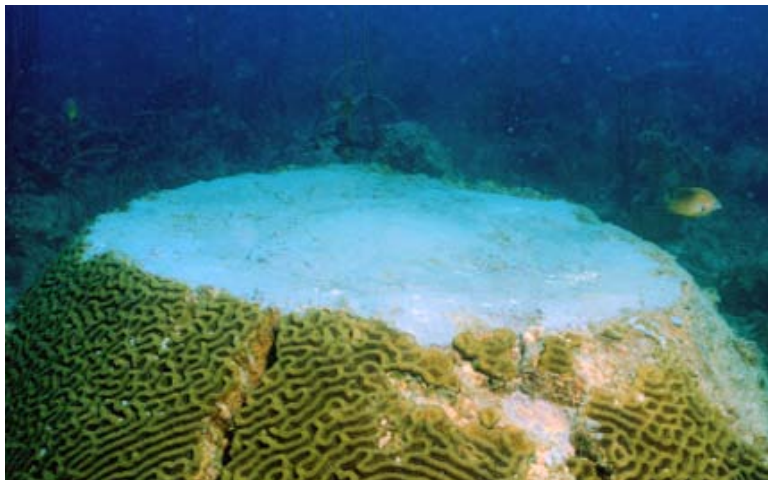
These bleached corals would normally be more brightly colored.

Most reef scientists believe that a rise in the temperature of the water makes the bacteria grow—and grow faster. If the water temperature returns to normal again, the invading bacteria die off and the algae can recover. Sometimes, coral can recover from bleaching. But if the situation that caused the bleaching does not change, the coral, and the reef, will die.



Humans are responsible for most of the destruction of coral reefs. Fishing methods that use poisons and explosives have destroyed over half the reefs in the Philippines. Seaside resorts and homes create soil **erosion** and polluted freshwater runoff. Fresh water is damaging to coral, and the runoff may also contain chemicals as well as waste material.

People damage reefs more directly, too. Sport boats and commercial ships break off large chunks of reefs. Gas and oil from boat engines seep into the reef **habitat**, poisoning coral, plant, and fish life. Some sport divers drop their boat anchors directly onto reefs or stand on the fragile coral. Others break off pieces of live coral to take home as souvenirs or to sell.



Boats sometimes break off large chunks of coral.



Each year, volunteer divers help clean some reefs of debris.



This officer's job is to watch and protect coral reefs.

## Protecting the Reefs

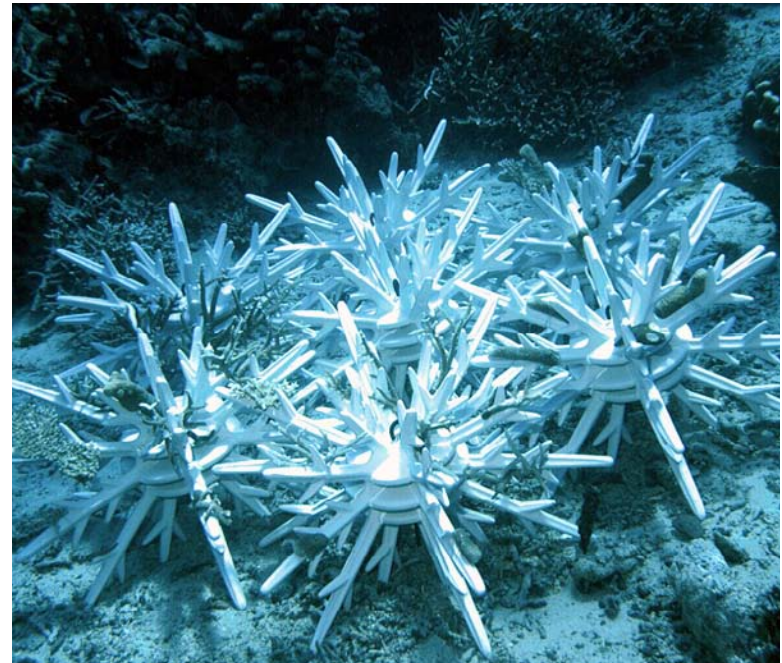
In addition to being naturally beautiful and appealing as recreational destinations, coral reefs are a valuable natural resource. Reefs help shelter our coasts from storms and floods. They are a critical habitat for much of the world's seafood and, as such, contribute to the economies of many countries. Reef plants and animals also provide many important ingredients for medicines.

Many countries have taken steps to preserve their reefs. In Florida and on the Great Barrier Reef in Australia, it is illegal to take fish, plants, or coral from protected areas. Humans and boats are not allowed near many fragile reefs. But this is only a start. Only about 3 percent of the world's coral reefs are protected, and many of the laws and guidelines are not consistently enforced.



Divers still enjoy visiting fragile reefs.

Almost a quarter of the world's reefs have already been destroyed. Nearly 60 percent are threatened. It is up to all of us to help prevent reef destruction. Even if you don't live near an ocean, your actions can have an effect on the health of coral reefs. Be careful not to litter or drop anything in the water. Learn what human actions cause an increase in ocean temperatures and the growth of bacteria. Conserve water and energy, and recycle as much as you can. If everyone does his or her part, coral reefs will remain a beautiful, natural wonder for centuries to come.



These human-made objects are put in the ocean to provide a safe place for new coral to attach and grow.



## Glossary

<b>atolls</b> ( <i>n.</i> )	circular reefs formed when coral grows around islands that later sink beneath the surface of the sea (p. 14)
<b>barrier reefs</b> ( <i>n.</i> )	reefs that sit farther from the shoreline, forming barriers between the open ocean and calm lagoons (p. 14)
<b>bleaching</b> ( <i>n.</i> )	when coral turns white after its algae die (p. 17)
<b>crevices</b> ( <i>n.</i> )	cracks and holes (p. 10)
<b>crustaceans</b> ( <i>n.</i> )	hard-shelled, many-legged sea creatures such as lobsters, shrimp, and crabs (p. 10)
<b>erosion</b> ( <i>n.</i> )	wearing or washing away of the soil (p. 19)
<b>fringing reefs</b> ( <i>n.</i> )	reefs that are very close to shorelines (p. 14)
<b>habitat</b> ( <i>n.</i> )	the place where a plant or an animal lives in nature (p. 19)
<b>lagoon</b> ( <i>n.</i> )	shallow, calm water between a reef and the shoreline or in the center of an atoll (p. 14)
<b>plankton</b> ( <i>n.</i> )	tiny animal or plant life in the ocean (p. 8)
<b>polyps</b> ( <i>n.</i> )	tiny individual coral animals (p. 5)
<b>runoff</b> ( <i>n.</i> )	soil, debris, and pollution that flows from streams and rivers into the sea (p. 12)
<b>tsunami</b> ( <i>n.</i> )	a great wave caused by an earthquake, volcano, or landslide (p. 12)

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