



Corals

Corals are small, sedentary marine animals that occur in dense colonies in warm shallow waters or oceans. Reef-building corals are scattered throughout the tropical and subtropical western Atlantic and Indo-Pacific Oceans, generally between 30 degrees North and 30 degrees South latitudes.

Coral reefs are formed by the skeleton remains of many generations of stony corals. Massive reef structures are built over thousands of years by tiny coral polyps aided by minute algae (zooxanthellae) that live in their tissues, calcifying algae, and other organisms that secrete calcium carbonate and adhesives. Reef-building corals are generally found at depths of less than 46 m, where there is sunlight and clear water through which the sunlight penetrates better. Reef-building corals, along with the algae, require warm ocean temperatures (20-28°C) and are therefore found along the eastern shores of major land masses, where the water is warmer. These reefs are amongst the earth's oldest living communities of plants and animals. They vary in shape, size, and color.

Coral Ecosystem

Coral reefs are sometimes referred to as "tropical rainforests of the deep" since they are one of the most diverse, productive, and beautiful marine ecosystems in the world. The extraordinary diversity of reefs makes them biologically important and, like rainforests, they have provided valuable scientific insights into the nature of underwater ecology. It is a diverse collection of species that interact with each other and the physical environment. The Sun is the initial source of energy for this ecosystem. Coral reefs are considered to be one of the most sensitive ecosystems to any change. When they are environmentally stressed, they lose much of the algae that gives their color along with other pigments. When this happens, the corals appear white in color and are referred to as "bleached."

Excessive growth and accumulation of phytoplankton and seaweed would be detrimental to coral vitality and diversity, and low nutrient conditions are needed to prevent this. Diverse and abundant populations of grazing fish and invertebrates also keep the growth down.

Creatures Found on Coral Reefs

The coral reef ecosystem is a diverse collection of species that interact with each other and the physical environment. The numerous species residing and depending on coral reefs represent a bank containing the genetic diversity necessary for adaptation to changes in the environment. Sponges have been an important part of the coral reef ecosystem. Sea anemones provide shelter to the fish and other creatures in the reefs. Fish play a vital role in the reef's food web, acting as both predators and prey. Bryozoans are microscopic invertebrates that form branching colonies over coral skeletons and reef debris, cementing the reef structure.

The reef is also home to a variety of worms, shrimps, crabs, lobsters, starfish, sea cucumbers, and sea urchins. Octopuses, squids, clams, scallops, marine snails, and also some species of sharks, skates, and rays live on or near the reef. Some sea turtles frequent reef areas. Green, loggerhead, and hawksbill sea turtles live in the warm waters of the Great Barrier Reef.

The Predators

The crown of thorns, which is a starfish, is a well-known predator of coral. Large numbers of these starfish can devastate reefs, leaving behind only the calcium carbonate skeletons. Parrotfish use chisel-like teeth to nibble on hard corals and eat the algae within the coral.

Eels are one of the reef's largest predators and feed on the small fish, octopuses, shrimps, and crabs.

Types of Reefs

There are three types of reefs: the fringing reef, the barrier reef, and the atoll.

- Fringing reefs border the shorelines of continents and islands in tropical seas.
- Barrier reefs occur farther offshore. The Great Barrier Reef off northern Australia in the Indo-Pacific is the largest barrier reef in the world. This reef stretches more than 2000 km.
- Atolls are reefs that surround a central lagoon. The result is several low coral islands around a lagoon. Atolls commonly occur in the Indo-Pacific region.

Importance of Corals and Coral Reefs

- Corals remove and recycle carbon dioxide. Excessive amounts of this gas contribute to global warming.
- Reefs shelter land from harsh ocean storms and floods by breaking the force of the waves, thereby allowing mangroves and seagrass to flourish.
- Reefs provide resources for fisheries.
- Reefs attract millions of tourists every year.
- The coral reef is an intricate ecosystem and contains a diverse collection of organisms. Without the reef, these organisms would die.
- Coral skeletons are being used as bone substitutes in reconstructive bone surgery.
- The coral reef provides a living laboratory for both students and scientists.

Major Threats to Coral Reefs

Deforestation, construction, and other activities have led to silt or sand covering the corals, smothering them, and preventing light from passing through.

Mangroves and seagrass that normally act as filters for sediment are being rapidly destroyed.

Prawn harvesters have destroyed large areas of corals to create artificial prawn farms.

Fishing with explosives has reduced nearby coral to lifeless rubble.

- Overfishing makes this problem even worse because the fish that would normally eat the algae have been captured and killed.
- Commercial fishing fleets often use cyanide and other poisons to stun and capture valuable reef fish. This poisons not only the fish but the coral polyps and other creatures in the area as well. In the Philippines, less than 10% of the coral reefs remain healthy due to extensive fishing.
- Trash dumped into the water can also kill coral reef life.
- Fertilizers and sewage dumped into coastal waters encourage rapid algae growth, which chokes coral polyps, and cuts off their supply of light and oxygen. This appears to be the case in some parts of the Great Barrier Reef.
- Careless boating, diving, fishing, and other recreational uses of coral reef areas can cause damage to coral reefs.
- Coral reefs are also threatened by global warming. There has been an unprecedented increase in the number of coral bleaching events during the past two decades (which have

had some of the warmest years in history). When ocean temperatures get too high, coral lose the symbiotic algae inside them, causing them to turn white, or “bleach,” and eventually die.

While coral reefs are sensitive to environmental changes, they appear to be able to recover effectively from physical disturbance or temporary pollution events, provided the water quality is generally high. For example, the corals in Kaneohe Bay, Hawai'i, for the most part recovered from severe overgrowth of algae after sewage inputs were diverted away from the Bay.

Conservation Measures

The world has woken up to the magnitude of the problem and has taken steps to halt this degradation of one of the richest ecosystems.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora, or CITES, has classified many corals as threatened species.

The establishment of marine sanctuaries or preserves may help ensure the availability of this ecosystem in the years to come. The Great Barrier Reef Marine Park was established in 1975 and is the largest project in the world dedicated to preserving the coral reef. Initiatives for the preservation of coral reefs in India have been undertaken on a large scale in the Wandur Marine National Park in the Andaman Nicobar Islands. People can also play a role in preventing this depletion. Corals should not be collected, either alive or dead. All waste should be treated before it is released into the sea, and no waste should be dumped directly into the water. Once people become aware of this issue, the wellbeing of these reefs can be ensured.