

Project Oceanography  
Coral Reefs IV:  
**Why Are Coral Reefs Important?**

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**WHY ARE CORAL REEFS IMPORTANT?**

**Coral reefs** are home to an amazing variety of other plants and animals, from microscopic **bacteria** and **protists**, to most kinds of **invertebrates**, to a dazzling display of **fish** and **sea turtles**. **Marine mammals**, especially dolphins and manatees, are common visitors, and millions of **seabirds** nest on tiny coral islands throughout the world.

In all **ecosystems**, both on land and in the oceans, there are **autotrophs** (*auto-* means self, *-troph* means nourish) and **heterotrophs** (*hetero-* means other). Autotrophs nourish themselves by photosynthesis, using sunlight, carbon dioxide, water and nutrient fertilizers such as nitrogen and phosphorus. Autotrophs in the oceans include many kinds of bacteria, algae, and seagrasses. Algae may be microscopic, such as **phytoplankton** (*phyto-* means plant, *plankton* means wanderer) or form large plants, such as **seaweeds**. Heterotrophs are nourished by feeding on “others”. Heterotrophs that feed on plants are known as **herbivores** (*herb-* means plant, *-vore* means to eat); those that feed on animals are called **carnivores** (*carn-* means meat); those that feed on bacteria and dead material (detritus) are called scavengers or **detritivores**.

Coral reefs thrive on the warmest, clearest waters of the ocean. The reason the water on a healthy coral reef is so clear is because there is very little nutrient, so plants like phytoplankton grow very slowly. Corals that build coral reefs are a **sympiosis** between coral animals and microscopic algae called **zooxanthellae**. The zooxanthellae live and photosynthesize within the tissue of the coral animal, giving most of the sugar that they produce during photosynthesis to their coral host. Because the coral animal feeds on **zooplankton** (*zoo-* means animal), and the zooxanthellae photosynthesize, together they play the role of **mixotrophs**, meaning that they have mixed ways of nourishment. In tropical regions, there is plenty of sunlight for photosynthesis, so the zooxanthellae can provide lots of sugar for the coral. The coral, in turn, captures food, which contains small amounts of nitrogen and phosphorus, enough to allow the coral to slowly grow. Because food is scarce and there are lots of hungry predators, the coral needs to protect itself. The zooxanthellae chemically help the coral to build its sturdy skeleton. Over hundreds of years, the skeletons of billions of corals slowly build the structure of the coral reef.

## WHY ARE CORAL REEFS AT RISK?

Coral reefs are highly adapted to live and slowly grow on very little food. However, this means that corals can be harmed in many ways by human activities. The most important thing for a healthy coral reef is clear water. But humans put many things into the water, both accidentally and on purpose. This is happening all around the world as more people live near coral reefs. Where people cut away the grass or forest to grow crops or build houses, soil, fertilizers and pesticides wash from the land to the sea when it rains. In many places, sewage is piped out to sea, elsewhere sewage is pumped into the ground, from where it can slowly move out to sea. **Fertilizers** and **sewage** provide nutrients to the phytoplankton, making the water less clear and less healthy for the corals. **Pesticides** can weaken the corals and make them more likely to get diseases. **Soils** can smother the reef. Coral reefs are always at risk of physical damage by **hurricanes** and other storms, and by ships, anchors and even divers. Unfortunately, coral reefs can recover from physical damage only if the water is clear and clean.