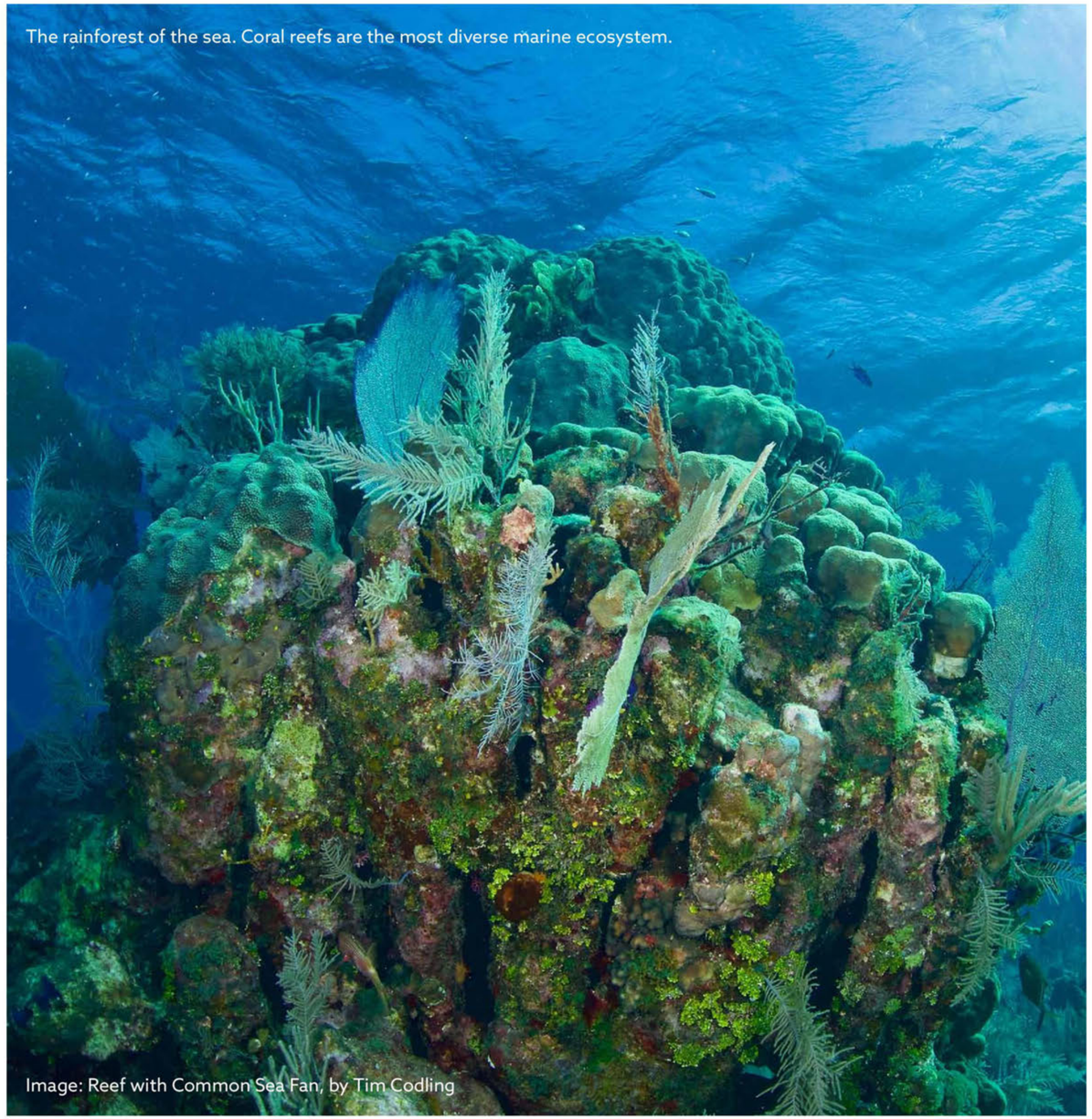
INTRODUCTION TO

CORAL REEFS

Coral reefs contain approximately 25% of the ocean's species, making them the most diverse marine ecosystem and giving them the nickname "the rainforests of the sea." This fact is made even more amazing when you consider that coral reefs only cover 0.1% of earth's surface!

Reefs provide food and shelter for thousands of species of plants and animals, including fish, crustaceans, sponges, algae, and turtles.

Reefs are important for people, too. Throughout the world, humans rely on coral reefs for food, protection from storms, jobs based on tourism, and even medicines.



The rainforest of the sea. Coral reefs are the most diverse marine ecosystem.

Image: Reef with Common Sea Fan, by Tim Codling

Adapted from www.oceanservice.noaa.gov, www.ocean.si.edu

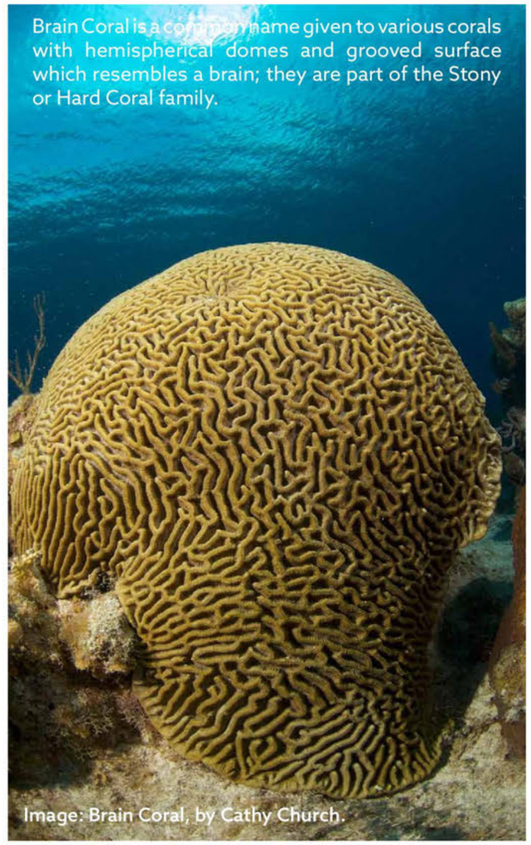
Individual polyps live together to form massive colonies.

Image: Great Star Coral Pink and Yellow, by Lindsay McGill

WHAT ARE CORAL REEFS?

Coral reefs are created from the skeletons of many small, soft-bodied animals closely related to anemones. Each coral animal is called a polyp, which consists of a soft cup of tissue surrounded by a ring of stinging tentacles used for capturing food. While individual polyps are very small—some are about the size of a pinhead—they join to form massive colonies. Coral reefs are formed by hermatypic corals or hard (stony) corals, which create skeletons made of calcium carbonate or limestone. These limestone skeletons are the building blocks of the reefs. Reefs come in many shapes and sizes, the biggest of which is Australia's Great Barrier Reef.

At 1,240 miles long, the Great Barrier Reef is earth's largest structure built by living organisms and is the only living structure that can be seen from outer space! It takes a long time to grow a coral colony or a reef, because each coral grows slowly, with most corals growing less than an inch per year. Individual colonies can often live decades to centuries, which we know because corals lay down annual growth rings, just like trees. By studying these skeletons, we can learn about what environmental and atmospheric conditions were like hundreds or thousands of years ago. The Great Barrier Reef began growing about 20,000 years ago!



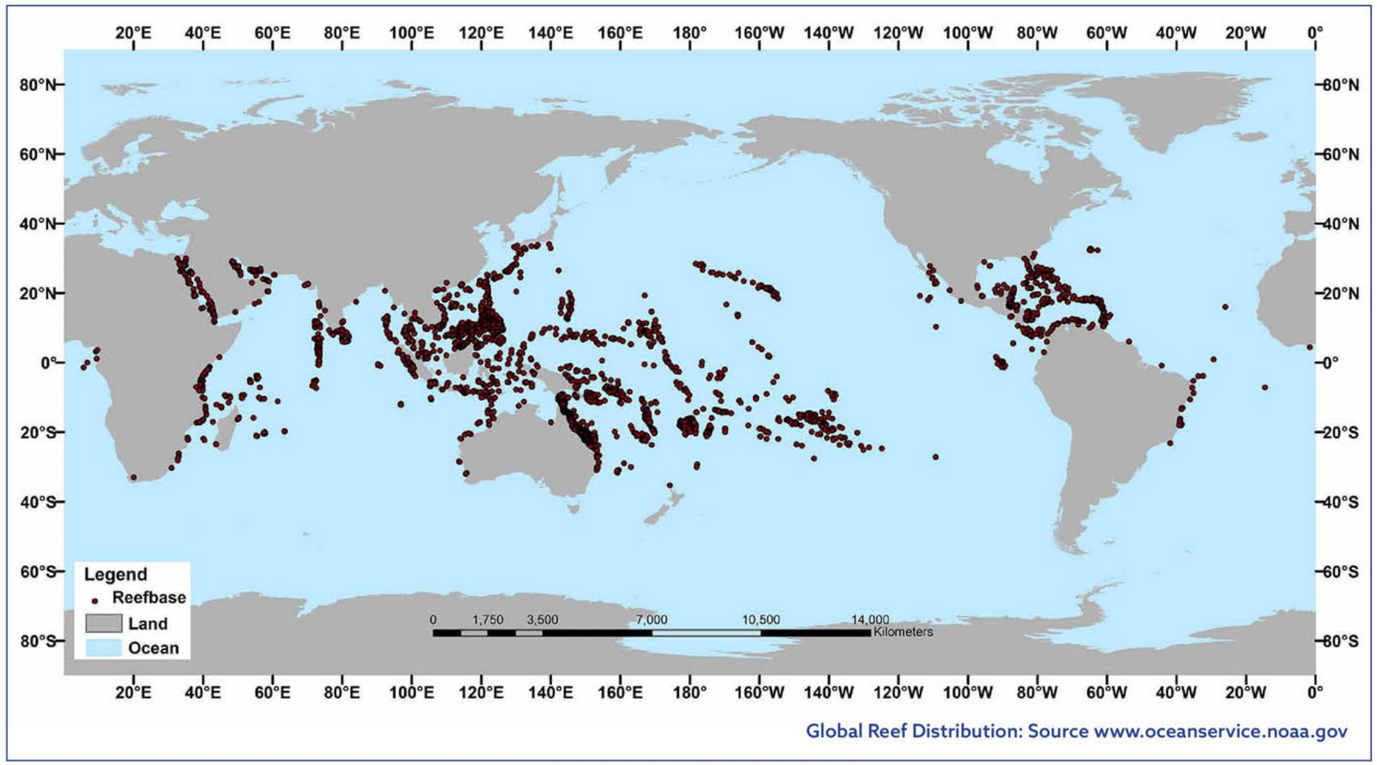
Brain Coral is a common name given to various corals with hemispherical domes and grooved surface which resembles a brain; they are part of the Stony or Hard Coral family.

Image: Brain Coral, by Cathy Church.

Adapted from www.oceanservice.noaa.gov, www.ocean.si.edu, www.doe.ky/resources/teachers

REEFS?

Corals are found across the world's ocean, in both shallow and deep water, but reef-building corals are only found in shallow tropical and subtropical waters. The ideal conditions for corals are shallow, clear, sunlit saltwater with a temperature of approximately 80°F (26°C). Most coral will die if the temperature is too warm or too cold for a prolonged period of time. Corals also needs plenty of sunlight to thrive, as they have microscopic algae living inside of their polyps which need light for photosynthesis. This photosynthetic process provides the coral host with 95% of the nutrients it needs to grow and thrive.



Global Reef Distribution: Source www.oceanservice.noaa.gov

WHERE ARE CORAL

Globally, 60% of coral reefs are in the Indian Ocean and the Red Sea, 25% are in the Pacific Ocean, and only 15% are here in the Caribbean Sea.

Image: Acropora Colony- Staghorn Coral, by Martin Colognoli

Adapted from www.ocean.si.edu

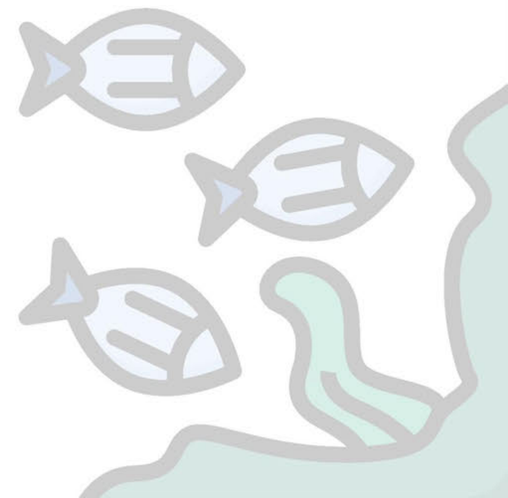
3.4 acres of fringing reefs surround Grand Cayman

Image: A Tiny Reef Habitat, by Courtney Platt

CAYMAN'S REEFS

The three Cayman Islands are all completely surrounded by reefs. Surrounding most of Grand Cayman are shallow water fringing reefs, which create shallow water sounds, such as the North Sound. Beyond the fringing reefs are two terraces which eventually plunge dramatically to form the famous 'Cayman Wall'. Little Cayman also has a large amount of shallow fringing reefs and associated sounds, whereas Cayman Brac has a very different topography. Reefs have been culturally and economically significant to Caymanians for hundreds of years and continue to play an integral role in our community today through tourism, fisheries, and protection of our shorelines. Recognizing the importance of our coast, the Cayman Islands has a Marine Conservation Law and Marine Parks Regulations to manage and protect our marine environment.

Adapted from www.doe.ky/resources/teachers/, www.nationaltrust.org.ky/coral-reefs



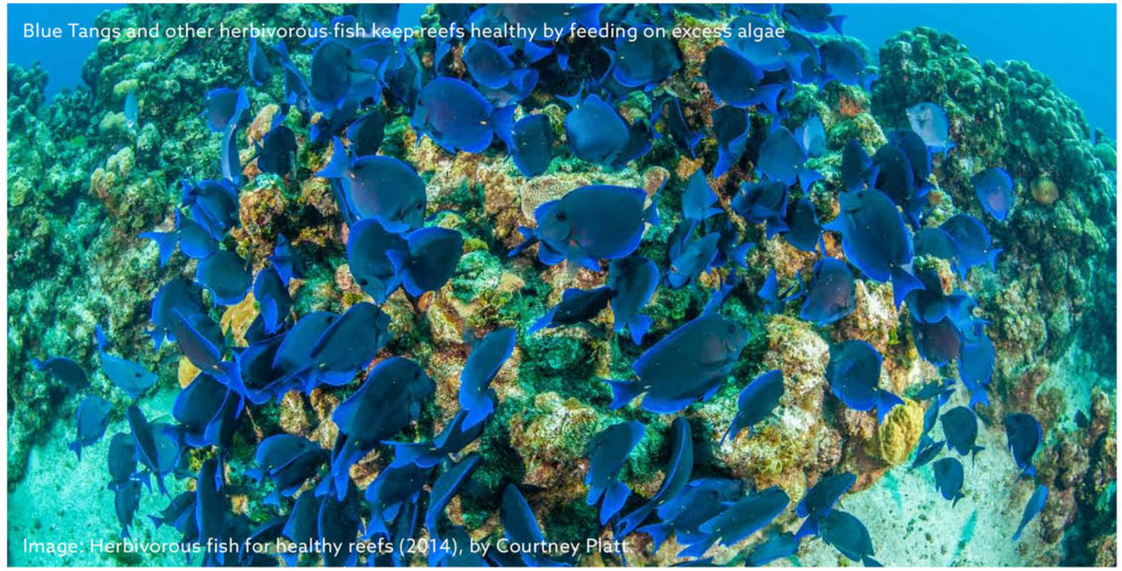

Blue Tangs and other herbivorous fish keep reefs healthy by feeding on excess algae

Image: Herbivorous fish for healthy reefs (2014), by Courtney Platt

WHY CORAL REEFS?


Diving and other reef-based tourism activities generate billions of dollars globally.

Image: Balboa Beauty by Courtney Platt

Adapted from www.oceanservice.noaa.gov, www.ocean.si.edu

Coral reefs are the big cities of the ocean. They teem with a dizzying array of life, supporting more species than any other marine environment. Reefs are communities where each species plays an important role in keeping the whole system healthy and functioning properly. Many small animals live on or inside other animals, including worms, mollusks, fish, and crustaceans that live in cavities of corals and sponges. It is this remarkable biodiversity and inter connectedness that makes reefs so important.

In addition to the countless species of plants and animals that rely on reefs for food and shelter, millions of people rely on reefs for the environmental and economic benefits they provide. Coral reefs protect our coastlines from wave action and erosion, which keeps beaches and coastal communities intact.

Reefs are also an important source of food, jobs, tourism, recreation, commercial goods and medicinal products. In coastal communities, reef-based tourism including diving tours, fishing trips, and resorts provide millions of jobs and contribute billions of dollars to the local economy all over the world.

Reefs are also increasingly being used in medicine, as many drugs are being developed from coral reef organisms as possible cures for cancer, arthritis, infections, viruses, and other diseases. Healthy reefs support healthy people and communities!

THREATS TO AND WAYS TO PROTECT

CORAL REEFS

It's hard to imagine that something as ancient and complex as reefs can be fragile, but coral reefs are extremely sensitive to environmental changes. The most serious of which are rising water temperatures and ocean acidification. High water temperatures cause coral bleaching, which can kill coral colonies or leave them stressed and vulnerable to other threats.

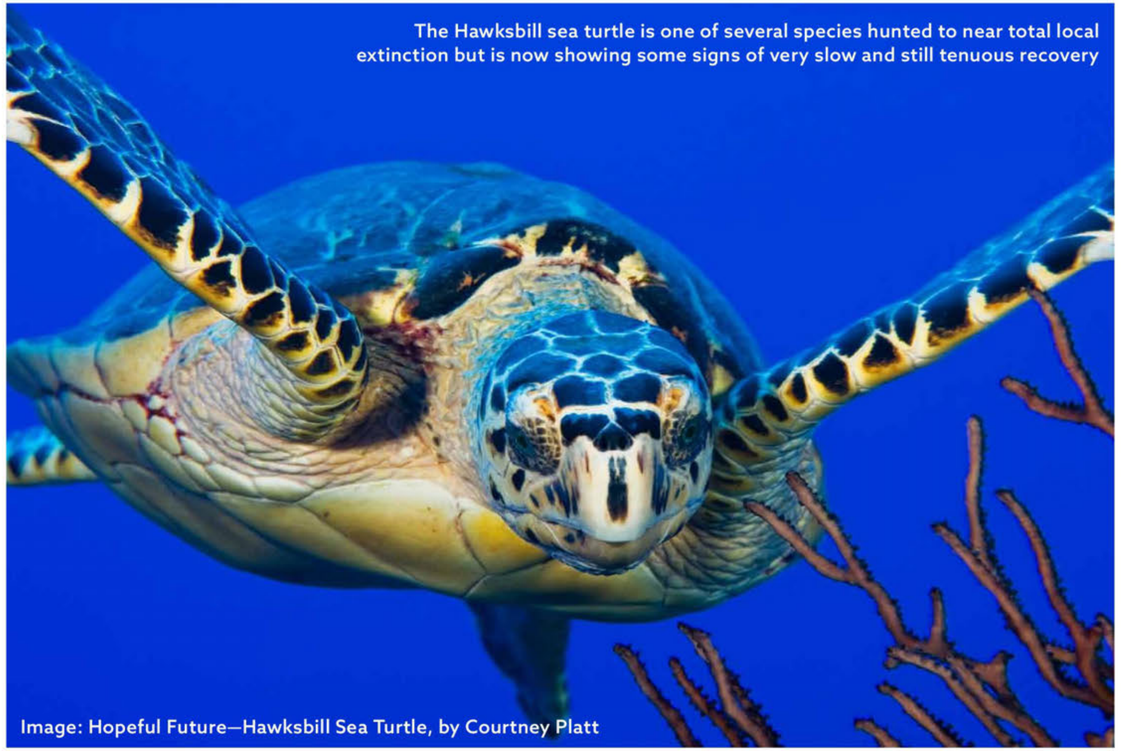
Meanwhile, ocean acidification makes it more difficult for corals to build their calcium carbonate skeletons. Other natural threats include storms, diseases, and and coral consuming animals such as snails and fireworms.

Human activities including pollution, over fishing, coastal development, destructive fishing, harvesting practices, and the introduction of invasive species such as the Lionfish are among other serious threats to coral reefs, but it's not all bad news! There are many ways that we can reduce these threats and protect these beautiful reefs.

Practices such as conserving energy, reducing the amount of waste we produce, and choosing sustainable seafood are just a few examples of simple actions that we can take to help protect coral reefs. And of course, educating yourself and others about coral reefs is one of the most important things you can do for the reefs!

Invasive species such as Lionfish threaten reefs, as they eat native fish and crustaceans and do not have any known native predators.

Red Lionfish (Pterois volitans), by Courtney Platt.



The Hawksbill sea turtle is one of several species hunted to near total local extinction but is now showing some signs of very slow and still tenuous recovery

Image: Hopeful Future—Hawksbill Sea Turtle, by Courtney Platt

Adapted from www.oceanservice.noaa.gov, www.ocean.si.edu