FACT SHEET

Australian Government
Department of Resources, Energy and Tourism

Lady Elliot Island
GREAT BARRIER REEF

eco CERTIFIED Advanced Ecotourism

LADY ELLIOT ISLAND

Corals

CORAL REEFS

Coral Reefs are one of the most complex and diverse ecosystems on the planet, hosting thousands of different plants and animals. A coral reef is the underwater equivalent of a bustling city that never sleeps - the buildings are made of coral, and thousands of inhabitants constantly coming and going, carrying out their business at all hours of the day and night.

WHAT ARE CORALS?

Despite their 'rocky' appearance, corals are living organisms. There are two main types of corals: (1) hard or reef-building corals, which produce a calcium carbonate skeleton and are at the origin of the 'reef'; and (2) soft corals that lack such a calcium carbonate skeleton. Each coral 'head' is a compact colony of thousands of identical individual 'polyps'. Coral polyps are generally withdrawn during the day for protection from predators such as Parrotfish, Butterflyfish, Angelfish, Sea Slugs or the Crown-of-thorns Starfish. At dusk, polyps emerge and use their tentacles to catch microscopic organisms such as plankton. However, a major part of their energy is derived from photosynthetic unicellular algae (called zooxanthellae) that live within the coral's tissue. Coral reefs therefore require a lot of sunlight and typically grow in clear, tropical to subtropical waters, typically at depths shallower than 60m (200 ft).

HARD CORALS

In reef building hard corals, each polyp secretes a cup-like limestone (calcium carbonate) skeleton known as a 'corallite'. As the skeleton grows, the colony develops. Each colony typically comprises of thousands of interconnected individual polyps. As such, should one polyp be disturbed, it will retract into its corallite and the surrounding polyps will follow. The Great Barrier Reef (GBR) is a perfect example of the long-term, slow coral growth process.

Over time, each polyp produces additional layers of calcium carbonate, resulting in the growth of the overall colony. As a result, coral reefs continuously evolve and grow. The GBR can be seen from outer space and is the largest structure made by living organisms.

Human activities are a primary threat to coral reefs, especially unregulated fishing and tourism. The coral skeleton is fragile and can be easily damaged by people touching, kicking or sitting on it.

There are more than 350 known species of hard corals on the GBR. The hard corals most commonly seen in Lady Elliot Island's waters are shown below and are mostly named after their appearance.

- **Branching/staghorn coral** are the fastest growing coral and are tree-like. Growth rate is 10-15 cm per year.
- **Boulder coral** slowest growing coral with a growth rate of 1 – 3 cm per year. Some large colonies can be up to hundreds of years old.

Branching Coral

Boulder Coral

Plate Coral

Branching Coral

Brain Coral

Mushroom Coral

- **Plate coral** Are plate shaped and designed to collect as much sunlight as possible. Found in deeper areas on the reef slope where the light levels are low.
- **Brain coral** The polyps do not form complete walls around themselves and create lines of mouths separated by skeletal ridges, making it look like a brain.
- **Mushroom coral** Mushroom coral Is different to most hard corals as it is a single polyp which lays free on the reef. It can round or oblong in shape up to 25 cm.

CORAL'S LITTLE HELPERS

Zooxanthellae (pronounced zoo-zan-thel-lee) are microscopic unicellular algae that commonly reside within coral tissues. Through the process of photosynthesis, they produce up to 90 % of the coral's energy intake; in return, the coral provides the zooxanthellae with protection and essential nutrients. This is called a **symbiotic relationship** because both parties benefit.

CORALS & COLOUR

Most coral polyps have clear bodies and white or pale skeletons. It is the algae (zooxanthallae) that live within their tissues that determine a coral's colour. Most reef-building corals get their golden-brown colour from these symbionts, while soft corals are typically more colourful. Visitors often comment that coral reefs are not as bright as they have seen in photographs. This is due to light absorption through the water column. As light passes through water, reds and yellows are absorbed within the first few metres of the water column, leaving blues and greens to dominate underwater. This is why underwater photographers often use artificial lights to restore colour balance and capture the true, vibrant colours of the reef.

SOFT CORALS

While soft corals contribute in only a small way to the formation of the reef, they form an important part of the coral ecosystem and its diversity. Unlike the solid, limestone skeleton that hard corals have, soft corals have tiny calcium 'spicules' in their tissues that provide support while still allowing flexibility. Their polyps have eight, feathery tentacles and are connected by fleshy tissue.

The soft coral spicules provide some protection from predators such as fish but their flesh also has toxins in the tissues. They can even release these toxins in the waters surrounding them in order to kill or keep surrounding coral and predators away.

Organ Pipe Coral

Pink Soft Coral

Gorgonian Fan

Soft corals are mostly suspension feeders; they use their tentacles to catch prey suspended in the water column. Their tentacles are often extended during the day and they do not need much light to survive, unlike hard corals. However, despite most soft coral using their tentacles to feed, some species also rely on their symbiotic relationship with zooxanthellae. Soft corals are mostly found in the deeper waters around Lady Elliot Island.

CORAL REPRODUCTION

Something very special happens every year, around November/December, 3-5 days after the full moon and at night. At this precise moment, the corals of the Great Barrier Reef release millions of tiny eggs and sperm in the ocean as part of their reproductive cycle, a phenomenon known as 'Coral Spawning'. The sperm and eggs then separate and are cross-fertilised from other surrounding colonies. The resulting coral larvae, called 'planulae', become part of the plankton and travel in ocean currents for days to weeks until they find a suitable rocky reef to settle. Once settled, the planulae attach themselves to the reef surface and will then develop into polyps and, in time, into a new coral colony. Corals spawn simultaneously in order to increase opportunities for fertilisation, but also to maximise chances of survival for the larvae. The mass spawning is timed to coincide with periods of minimum tidal movements, which allows time for cross fertilisation to occur. Stronger currents will then disperse the coral larvae in order to colonise new rocky substrates. Some corals can also reproduce and grow by asexual reproduction (such as budding and fragmentation) which happens throughout the year.

THREATS TO CORAL

When corals face severe stress, such as when sea temperatures suddenly increase, the polyps expel their zooxanthellae. The first sign is usually a change in colour to bright pastel hues (blues, pinks, purples and yellow), indicating that the colony is deprived of symbionts. If conditions do not improve for the colony, the polyps will die, leaving only the coral's white skeleton. This phenomenon is commonly described as 'coral bleaching'. In most cases, corals can recover after the stressful conditions subside. They will slowly regain their zooxanthellae, and hence their colour.

Climate change and resulting warming ocean temperatures have been the main cause of recent coral bleaching events. The Great Barrier Reef suffered from large scale bleaching events in 1998 and 2002 when increased water temperatures (of 1 - 2 degrees C) resulted in over 55% of the corals losing their zooxanthellae. Other threats related to Global Warming include ocean acidification, storms, Crown-of-thorns Starfish outbreaks and other human impacts like pesticides, sediment and nutrients.

WHAT **YOU** CAN DO TO HELP CORALS

- Don't touch, kick or handle corals when reef walking, snorkelling or diving
- Use electricity and water sparingly on the Island to help reduce our greenhouse gas emissions
- Ask our team about participating in a Coral Watch or REEFSearch surveys to monitor the health of our reef

DID YOU KNOW?

Corals are able to produce their own 'sunscreen'. They secrete a sun-blocking mucus that helps protect them from high levels of UV radiation. This is especially important at low tide, when corals on the reef flat become more exposed to direct sun exposure and stronger UV radiation. Recent research by Australian scientists has highlighted a chemical compound in corals' mucus as a natural 'factor 50' sun block, which may be helpful in designing future organic sunscreens.

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