

Our Great Barrier Reef

We really need to keep it great

FOR many of us lucky enough to live so close to the Great Barrier Reef we often take it for granted.

We know that it's the world's largest natural feature and that it can be seen from outer space. We also know that right now it's under pressure from a wide variety of human and natural impacts.

In this series of articles we hope to bring you useful information about the Great Barrier Reef, it's geography, history and biodiversity.

The Great Barrier Reef belongs to all of us and therefore, it's up to us to keep it great.

The Great Barrier Reef covers more than 348,000sq km; that's larger than England, Scotland, Ireland and Wales combined and slightly smaller than Germany and Japan. It is more than 2000km long and comprises more than 2900 individual reefs and about 940 islands.

It's not just the luscious coral and colourful fish that make up the Great Barrier Reef.

Other areas or "bioregions" also play an important role. These areas can include; mangroves, estuaries, sandy and coral cays, continental islands, seagrass beds, algal and sponge gardens, sandy or muddy seabed communities, continental slopes and deep ocean trenches.

All of these areas are important in the life of the plants and animals on the Reef. They are all interdependent and of equal importance in the circle of life surrounding many plants and animals.

Speaking of plants and animals, did you know that the reef is home to thousands of life forms?

There are; 1500 types of fish, 360 types of hard corals, 4000 types of molluscs (eg shells), 1500 types of sponge, 800 types of echinoderms (sea stars, sea urchins etc), 500 types of seaweed, over 30 types of marine mammals and six types of marine turtles.

Because the reef is such a special place, in 1975 the Australian government decided to create the Great Barrier Reef Marine Park Authority to look after it.

They even created the Great Barrier Reef Marine Park Act(1975), which provides rules and regulations designed to help protect the reef.

The creation of the Great Barrier Reef Marine Park Act (1975) has helped protect the reef but more help is needed.

Right now, the reef is under more pressure than ever before. It's up to all of us to work together to preserve it for the future.

Most of the pressure on the reef comes from people. We all contribute to polluting the marine park.

Since Europeans started to settle the north-eastern coast of Australia, about 150 years ago, pollution levels have increased and show no signs of decreasing.

There are fewer fish in a number of areas, and between 70% and 80% of coastal wetlands have been lost in most of the major river catchments adjacent to the Great Barrier Reef and nutrients such as phosphate and nitrogen have increased by 200% to 1500% in river discharges.

Coastal development, fishing and farming have all contributed to the increase in pollution. This has also led to worrying trends, which have also threatened the animals and plants on the reef.



The Queensland population of loggerhead turtles is on a fast track to extinction with a 90% decline in the annual number of nesting females since the 1970s.

The main causes of the decline were fox predation on nests laid on the mainland coast, and incidental capture in trawl nets.

In 2001, the Australian and Queensland governments recently required the compulsory use of turtle excluder devices (TEDs) for trawlers. It is hoped that this will reduce the number of marine turtles that used to get caught in trawl nets each year.

Dugongs are also in trouble with a 90% decline in dugong numbers south of Cooktown since the 1960s.

Dangerous organo-chlorine pesticide residues have been found in dugongs. In response to the decline in dugong numbers, a world's first system of Dugong Protection Areas was established in 1998.

Although the pressure on the habitats and on animals and plants of the reef has increased, we can all help to reduce it.

Everyone can do a bit and you should encourage everyone in your home to help keep it great.

To improve the quality of water reaching the reef do not put chemicals down the drain, keep drains and gutters clear of rubbish, limit your use of pesticides and fertilisers, take care not to spill petrol or oil when fuelling boats or changing the oil.

Use biodegradable toilet paper and phosphate-free cleaning products.

When fishing ensure that you take only as many fish as you need, return unwanted or undersized fish to the water as quickly as possible, and take old fishing line, plastics and other rubbish home with you.

Remember, everything that we wash off at home goes into the sewer and out into the Great Barrier Reef.

To learn more about what you can do to help keep it great visit www.gbrmpa.gov.au and www.reefed.edu.au.



FROM TOP: Dugongs are in trouble on the Great Barrier Reef; There are 1500 types of fish on the reef; Beautiful corals and sea creatures can be found; Take your rubbish with you after a visit to the reef to help keep it pristine.

Our Great Barrier Reef

Protecting our reef

WHO protects the Great Barrier Reef Marine Park? The Great Barrier Reef Marine Park Authority (GBRMPA) in Townsville holds prime responsibility for managing the Great Barrier Reef Marine Park.

It works in partnership with the Queensland Parks and Wildlife Service (QPWS), which is primarily responsible for the day-to-day management of activities that occur on the water and the land within the Great Barrier Reef Marine Park.

The rangers we meet in Queensland parks and on the water are Queensland Parks and Wildlife staff.

Other organisations that play an important role in protecting the reef include Customs Coastwatch, the Australian Federal Police, Department of Primary Industries, Queensland Fisheries, Queensland Boating and Fisheries Patrol, Water Police, and the Australian Maritime Safety Authority.

There are also community-based groups that work with the commonwealth and state agencies to protect the reef.

Local Marine Advisory Committees (LMAC) have been established in 10 regional centres along the coast of the Great Barrier Reef World Heritage Area.

They are made up of representatives from many different groups, including indigenous people, commercial and recreational fishers, agriculturists, and representatives from the wider community.

These committees advise the GBRMPA on issues affecting local communities, and provide a vital communication link between local communities and management agencies.

The GBRMPA uses several methods to protect the reef.

Zoning is one method. Zoning gives protection to areas that are very important for maintaining a healthy environment. Colours are used to show zones on maps. The zones tell people which activities are allowed to happen in particular areas.

The GBRMPA also uses management plans to control activities in the marine park. These plans deal with important issues like the size of tourist boats and the number of people they can carry. They also regulate access to special areas. These include seabird nesting sites, whale protection areas and anchorages.

For many activities people need to have a permit. Permits help people and companies use the marine park. They also help protect the reef by regulating the number of people and activities that can take place at particular locations on the reef.

It is a legal requirement to obtain a permit to conduct many activities, such as scientific research in marine park. Permits tell people which reefs and islands they can

the type and number of boats they can use, the number of visitors they can take to any one site, and the types of activities they can take part in at the site.

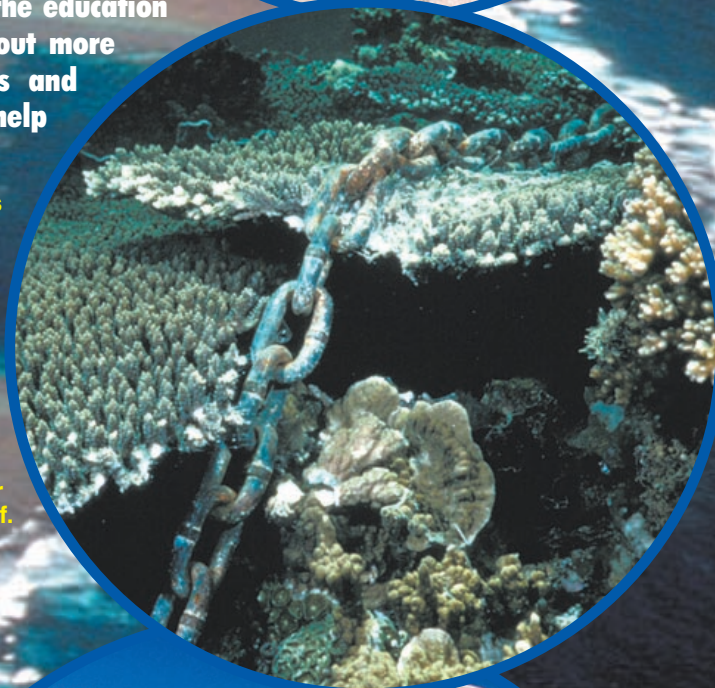
The Great Barrier Reef and the waters that surround it are directly affected by coastal towns and cities, which discharge stormwater and wastewater into it.

Many activities carried out onshore can impact directly on the reef. To minimise these impacts the GBRMPA works closely with city councils and other management agencies to help protect the Great Barrier Reef.

Kids are the future. The GBRMPA supports programs, such as the future leaders Congress for Sustainable Seas and Reef Guardians Schools Program, to encourage and empower young people to become involved in protecting the reef.

Ask your teacher to contact the education team at the GBRMPA to find out more about these special programs and you too can do your bit to help "keep it great".

FROM TOP: Queensland Parks and Wildlife staff take care of the reef just as they do the land; Other groups patrol the Great Barrier Reef including officers from Queensland Fisheries and Customs Coastwatch and Water Police; What we do while we are in the marine park will have an effect on the reef; Management plans are used to regulate special areas including bird nesting sites; The reef is affected by stormwater and wastewater run-off.





GREAT BARRIER REEF

MARINE PARK AUTHORITY

let's keep it great

Reef Beat

Our Great Barrier Reef

Reef Habitats

When people think about the Great Barrier Reef they usually associate it with colourful fish and coral gardens. However, the Reef contains many different habitats, which are all interlinked and vital to the myriad of animals and plants that live there.

The word 'habitat' means 'a place where an organism lives.'

Some of the different habitats on the Great Barrier Reef include coral cays, ribbon, fringing and platform reefs, reef flats, seagrass beds, continental islands, mangroves, rock pools, muddy bottoms, sandy substrates, lagoons and continental shelf.

In this article, we look at some of these habitats to help you understand how they are formed, and the critical role they play in the life of the Great Barrier Reef.

First, it's important to understand why different habitats matter. If you look at it from your personal point of view, the idea is easy to understand. For the first few years of our life, we usually live at home with our parents or caregivers. When we get a bit older, we go to school, a new habitat where we learn basic skills like reading and writing, and how to get along with other people at work and play. A few years after school, we move on to yet another habitat to start our own families, and the whole process begins anew.

The same is true for fish and other sea life. For example, a fish that hatches on the outer Great Barrier Reef may float in its larval form to the deep ocean, as part of the vast floating mass of microscopic plants and animals known as 'plankton.' As it develops into a juvenile fish, it may swim back to shore to live in sea grass or mangrove areas. Those that survive to become adults may move back to the coral reef to breed and, as with humans, the whole process of new life starts all over again. As you can see, each of the deep ocean, mangrove, and seagrass bed habitats are just as vital to the fish as the coral.

Coral cays are among the most beautiful habitats on the Reef. Cays are small islands of sand that form on top of coral reefs. The sand on coral cays is made up of reef animal skeletons, shells, and other debris. As waves wash around reefs, they deposit sediment on the calm, or leeward, side of the reef that is protected from the wind. Initially coral cays are little more than exposed sand banks, but as they grow, their position changes constantly in response to weather conditions.

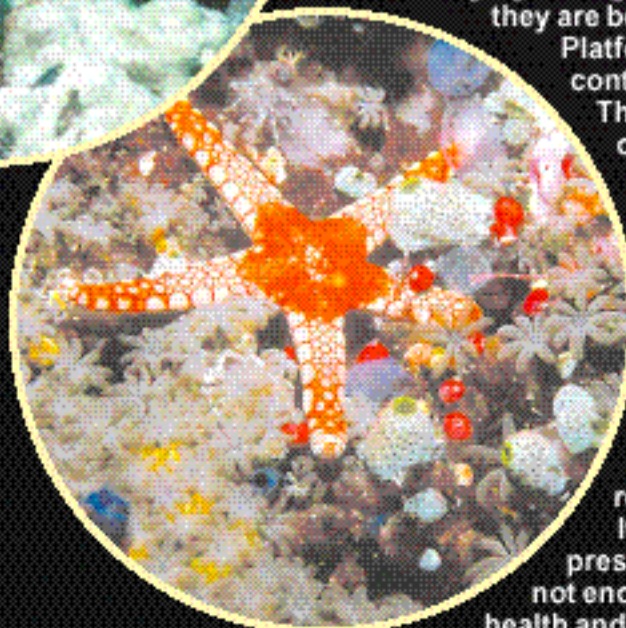
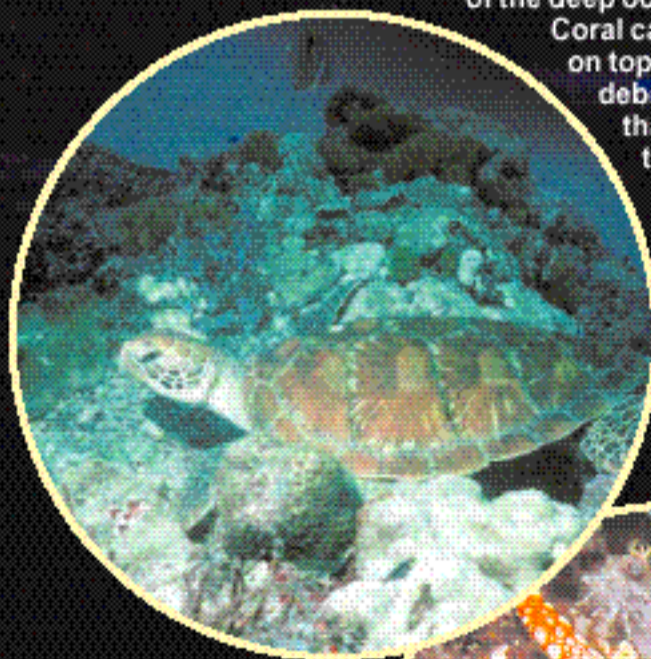
Cays grow larger and become more stable as they accumulate sediment. Water flowing through the sediments reacts chemically with the skeletons of dead coral to form beach rock. Like concrete, the beach rock further stabilises the cay. The seeds of plants also reach the cay, drifting on the ocean, or arriving attached to birds' feathers or in their dung. This gradually increases the cay's soil cover and fertility, which in turn encourages the growth of more plants and further strengthens the cay.

Fringing reefs, which grow around continental islands, and occasionally along the mainland, are another important habitat. Their closeness to land means that they are affected by run-off and sedimentation from urban centres and rural land use practices. Compared to outer reefs, fringing reefs generally host fewer hard corals and more soft corals and algae because they are better able to withstand inshore conditions.

Platform reefs are another important habitat normally found on the continental shelf away from the influences of run-off from the mainland. Their shape results from a combination of wind and rain erosion that occurred during ice ages, and the endless process of growth and erosion of the Reef under water.

During the last ice age, sea levels were much lower than they are today, and much of the area currently occupied by the Reef was coastal lowland, with dry limestone hills eroded by wind and rain. As the ice retreated to the poles and mountains, the sea reclaimed the land and coral grew again on the hilltops, adding between 5m and 20m of new growth during the past 10,000 years.

Ribbon Reefs grow along the edge of the continental shelf with the longest continuous stretch extending nearly 670km between Cooktown and the Torres Strait. Ribbon reefs are essentially elongated platform reefs. Why they occur only in the northern Great Barrier Reef is unknown. It's essential that all the diverse habitats of the Great Barrier Reef are preserved for the future. Just protecting the colourful corals and pretty fish is not enough. All Reef habitats are interdependent and essential for the overall health and long-term survival of the Great Barrier Reef.



Our Great Barrier Reef

Animals on the reef

The Great Barrier Reef can be compared to a big city, with its inhabitants going about their business during the day, and others coming to life at night.

It's a complex and interdependent ecosystem where all the animals great and small are important to the ultimate survival of the Reef. Virtually all major and minor groups of living things are represented, and only tropical rainforests come close to rivalling the Reef for richness of species.

The Great Barrier Reef is home to an amazing variety of fascinating animals which live on the Reef's many islands, on the shore and underwater.

While most people associate the Reef with the colourful corals and the brilliant fish, its other inhabitants are just as intriguing. First-time visitors are amazed by the variety of animals that live there. Even the organisms found beneath a coral rock are astonishing, for example, colourful encrusting sponges, colonial and solitary sea squirts, delicate lace corals or bryozoans, slithering serpent stars and worms, and scores of other colourful and oddly shaped animals.

About 359 kinds of hard coral, 4000 molluscs, such as snails and clams, and thousands of different sponges, worms, crustaceans, and other, less familiar creatures live on the Great Barrier Reef. It is also home to 800 echinoderms, like starfish and sea urchins, 1500 types of fish, 215 bird varieties, of which 29 are seabirds, more than 30 marine mammals, and six marine turtle species — all listed as threatened. Several rare and endangered animals breed on the Reef, including humpback whales that swim from Antarctica to give birth in the warm tropical waters, and dugongs that live and feed in the sheltered coastal seagrass beds.

Science has described over a million species of animals. Only about 5% of these possess a backbone, and they are known as vertebrates. All others, constituting 95% of the animal kingdom, are invertebrates. On the Great Barrier Reef, animals without backbones outnumber vertebrates by 20 to one, and new species are discovered every month.

Invertebrates are the foundation of the Great Barrier Reef and lead an astonishingly diverse range of lifestyles. Without them, the Reef could not exist. They come in myriad colours, shapes and sizes, from clams to cuttlefish and corals to crabs. Some, like the octopus are among the most intelligent animals in the ocean. Others have no brain at all. Jellyfish drift over hundreds of kilometres driven by winds, tides and currents. Sponges, by contrast, live most of their lives anchored to just one place.

Animals with backbones — the vertebrates — include mammals, birds, reptiles and fishes. Although as we have seen, vertebrates in the Great Barrier Reef Marine Park are heavily out-numbered by invertebrates, they constitute some of the largest and most spectacular animals on Earth, such as the great whales, sharks and estuarine crocodiles.

The many islands of the Reef also support a diverse range of animals and birds. Among the land mammals, the Proserpine rock wallaby is found only in the Proserpine area and on a few offshore islands in the Whitsundays. Koalas, echidnas, possums, water rats and fruit bats also live on the islands of the Great Barrier Reef.

The reptiles and amphibians are represented by seven frogs, nine snakes and 31 lizard species. Species richness decreases with increasing latitude and distance from the mainland.

The islands and cays of the Marine Park have a similar range of land bird species to the adjacent mainland, but the Park is particularly important to populations of pied imperial pigeons that migrate to the Park from Papua New Guinea and an endemic silvereye which lives in the Capricorn-Bunker group of islands.

Whether they live on land, underwater, fly through the air or drift on the ocean currents, the animals of the Great Barrier Reef are all important and depend on each other. It's up to us ensure that the Great Barrier Reef stays great — not just for people, but for the thousands of animals that call the Reef home and depend on it for their survival.





GREAT BARRIER REEF
MARINE PARK AUTHORITY

Reef Beat

news-mail

Our Great Barrier Reef

Tourism on the reef



If you have ever travelled somewhere to look and learn about a place then you have been a tourist. In fact most Australians have been tourists at some time or another.

One of the best places in the world to be a tourist is, of course, on the Great Barrier Reef. Its colourful corals, fishes and tropical waters make it a place almost everyone wants to visit.

As a matter of fact more than 1.6 million tourists visit the reef every year and tourism is the largest commercial activity in the marine park.

That means people come from all over Australia and the world and spend money to visit the reef.

The visitors pay tourism companies to take them out snorkelling, sailing, scuba diving or just to have a look through a glass bottom boat.

Tourism brings in more than \$1 billion each year. That money helps keep businesses operating and gives people jobs.

The tourists come from all walks of life and all ages. Some tourists are backpackers, some are families and some are millionaires visiting on luxury holidays.

More than half of the visitors are from overseas and about a third are from interstate.

Although there are many visitors to the reef, the activities they undertake usually have a small impact on the reef environment.

This is because the reef is so large and most of the activities tourists get involved in are restricted to small areas.

Most tourists access the reef from Cairns, Port Douglas or the Whitsundays. Together these areas attract more than 85% of all tourists to the marine park yet make up less than 10% of the total area.

Many tourists are interested in learning about the reef and how to best protect it.

Tourism operators teach visitors how to take care of the reef and not damage the environment, especially when diving and snorkelling.

More and more tourists are wanting to actively get involved in helping scientists with their work. This way they are seeing the reef and helping scientists learn more about it.

There are also ways you can help protect the reef when you visit.

The first rule on the reef is to never touch anything. Many animals become stressed through human contact.

Also, you should never stand on the coral reefs. This could substantially damage coral colonies.

Another important rule is to never throw rubbish overboard.

The Great Barrier Reef Marine Park Authority (GBRMPA) is the Commonwealth Government's agency responsible for managing the Great Barrier Reef.

The GBRMPA ensures the marine park is used in a sustainable way. That means it needs to be used in a way that will see it preserved in the future.

One way the GBRMPA looks after the reef is by co-operating with the tourism industry. An example of this is when the GBRMPA and tourism operators develop codes of conduct to encourage best environmental practices.

Community participation is also important in managing the marine park.

Many tourism operators get involved in voluntary programs, like the online coral bleaching program.

Under this program tourists who see coral bleaching out on the reef can report it to the GBRMPA through the Internet.

There is also the COTSWATCH program where tourists can report crown of thorns star fish. With the Eye on the Reef program, tourism operators report their daily reef observations.

Tourism is a great way for people to enjoy the beauty of the Great Barrier Reef and to learn about its fascinating plants and animals.

More and more tourism operators, and tourists themselves, are becoming involved in looking after the reef and helping to keep it great.

To learn more about what you can do to help keep it great visit www.gbrmpa.gov.au and www.reefed.edu.au.

FROM TOP: The Great Barrier Reef is a wonderful snorkelling environment. Reef tourists will always find something to do. Scuba divers flock to the reef in their droves to study the colourful corals and vibrant sea life up close. The reef attracts boat-loads of tourists each year.



Our Great Barrier Reef

Traditional owners

Aboriginal and Torres Strait Islander Traditional Owners hold a vast knowledge of the marine environment, marine animals, their habitats and their lifestyles.

Aboriginal and Torres Strait Islander people are the Traditional Owners of the Great Barrier Reef region. For over 60,000 years their traditional connections have been a part of the unique living maritime culture of more than 50 Traditional Owner groups along the coast of the Great Barrier Reef for thousands of years.

Torres Strait Islanders travelled through reef waters to trade with mainland Aboriginal groups along the east coast, and to collect resources for their subsistence lifestyle.

Their myths and legends of the sea

are expressed through dance and

song, and there are many creation stories for the region's islands and reefs.

Some of the Aboriginal tribes along the coast have dreaming stories from when their ancestors lived on the coastal plain near the edge of the present continental shelf. The ancient coastline was drowned by rising sea levels at the end of the last ice age. The sacred places and accounts of the past provide the connection to traditional clan areas and a rich heritage.

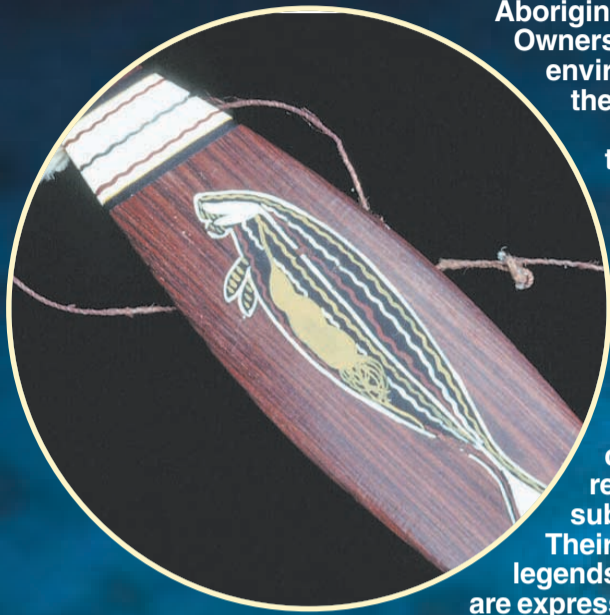
After 1788, Colonisation of Australia led to major changes in Aboriginal and Torres Strait Islander societies, cultures and clan estates. Cultural activities and customary practices have evolved through the use of modern technologies and major changes in the world. Aboriginal and Torres Strait Islander traditional customs and spiritual lore continue to be practised today in their sea country areas.

Traditions like hunting and gathering are of high cultural importance. The social sharing during special events that require traditional resources is also significant.

The cultural and economic importance of marine turtles and their value as food has given Indigenous people a practical understanding of their natural history and habits. Marine animal food resources such as turtles and dugongs strengthen Indigenous culture and demonstrate affiliation with tradition and traditional areas.

The activity of pursuing the turtle itself has great significance, and is an expression of the continuance of a long cultural tradition, with great importance in the hunting and social sharing of meat. The taking of turtles is restricted to hunting by Aboriginal and Torres Strait Islanders in the Great Barrier Reef Marine Park. A permit is necessary for traditional hunting.

Today, Traditional Owners are concerned about the future management of their sea country, and want to be involved through a number of management initiatives. Traditional owners are working with marine management agencies to develop a range of options to enable them to continue the evolution of their culture, and connection to the country for future generations. Traditional hunting, fishing and gathering activities in the Great Barrier Reef Marine Park are being considered as part of the Representative Areas Program. To learn more about what you can do to help keep it great visit: www.gbrmpa.gov.au and www.reefed.edu.au



Our Great Barrier Reef

Water the key to reef



If we talk about coral and the Great Barrier Reef it's obvious to everyone that water is necessary for coral and fish to survive but you may not be aware of is just how important water is to everything that interacts with the reef.

The Great Barrier Reef is under pressure. Everything we do on the reef, along the shore and even on the land, affects this diverse and fragile ecosystem. Water links the land to the reef. What we do on the land affects the quality of water flowing into the reef.

If we look at the earth from outer space it's obvious that most of our planet is covered in water. Some people have referred to earth as the "big blue marble in space" because of its appearance from the moon. About 80% of the world is covered by water and 97% is salt water in the oceans. Fresh water makes up only 1% and 2% is frozen as polar ice.

Coral reefs develop only in areas of the ocean with fairly shallow, clean, clear water with good penetration of sunlight. The water must have very low nutrient levels and the temperature must be warm (22(-) - 29(C), and very stable. Given these conditions, remarkable coral reef ecosystems, representing some of the most species rich

and complex ecosystems on earth, have developed on the Great Barrier Reef and in other tropical regions.

Reef-building coral polyps can survive only in water that has a stable temperature and chemistry, and there must be large amounts of direct sunlight all year-round.

If you live in North Queensland you may have wondered why there is no surf to enjoy on our beaches. That's because the waves break way out to sea on the Great Barrier Reef. We can always go surfing down south for our sport but for the reef the waves are very important. As waves break on reef crests, they create powerful surges of clean, well-oxygenated water that is essential for the well being of corals.

Water quality is central to the life of the Great Barrier Reef. Flooding by freshwater runoff, silt from muddy streams and rivers, and wastewater from human activities can create water conditions that make it hard for corals to survive.

Coastal environments, like mangroves, swamps and saltmarshes, are of tremendous importance to the function and existence of coral reefs. Reefs are exposed on one side to the vast open ocean and sometimes to land masses on the other. Communities like mangroves, estuaries, seagrass beds and lagoons typically found in the vicinity of coral reefs influence them by either importing or exporting nutrients.

Because water is so important to the reef we need to ensure that the quality of the water is kept in a condition that will keep the plants and animals, large and microscopic, healthy.

Corals are good indicators of water quality. Changes in their colour and growth rates can signal the presence of harmful chemicals and toxins.

Salinity is the dissolved salt content of the water. The Great Barrier Reef needs a fairly constant salinity regime of 35gm of sea salt per litre of seawater. Very low salinity water, originating from rivers during big flood events, rarely reaches the outer reef.

Oxygen is essential to reef organisms for respiration, a fundamental process that converts food to energy. Respiration of animals and plants consumes oxygen continually. Few organisms can tolerate low oxygen levels for long periods of time.

Coral reefs only flourish in low nutrient waters, where nitrogen and phosphorous are scarce. Too many nutrients can harm the corals and may even kill them if they are exposed to high nutrient waters for too long. Large amounts of silt in the water can also affect corals by reducing light penetration that is required to help them grow.

Life on the Great Barrier Reef exists due to a delicate balance of oxygen, nutrients, sunlight and wave motion. If there is too much or too little of any of these the plants and animals struggle to survive.

When it comes to keeping the Great Barrier Reef great, water quality is one of the keys to preserving the reef for the future.

For further information visit www.reefed.edu.au.

