



Australian Government
Great Barrier Reef
Marine Park Authority

REEF FACTS - /

Reef Facts for Tour Guides

A “big picture” view of the Great Barrier Reef

Size matters

The Great Barrier Reef is the largest tropical coral reef system in the world – and by a fair few country miles! To put it all into perspective, the Reef is about 2300 kilometres long, stretching along Queensland’s coast from the northern tip of Cape York to just north of Bundaberg.

When it comes to length, the Belize Barrier Reef (which sits off the Caribbean coast of Belize) is a distant second at only 290 kilometres. Ningaloo Reef, off the coast of Western Australia, is just 280 kilometres.

At just more than 348 000km², the Great Barrier Reef Marine Park is the second biggest tropical marine protected area in the world. Only the Northwestern Hawaiian Islands National Monument (declared in June 2006) is bigger, and only by about 20 000km².

The Great Barrier Reef Marine Park is still the largest protected reef system in the world, and the Great Barrier Reef World Heritage Area is still the largest World Heritage Area.

The Great Barrier Reef Marine Park is:

- 348 000 kilometres²
- About 70 million football fields
- Bigger than Victoria and Tasmania combined
- Bigger than New Zealand
- Bigger than the United Kingdom
- Roughly the same size as Japan
- Approximately half the size of Texas.



These maps compare the outline of the Great Barrier Reef (seen in place in the top map) with countries around the world.

our great barrier reef
let's keep it great





Telling the story - the numbers game

The Reef hosts one of the most complex ecosystems on the planet, and the facts and numbers associated with the Reef makes for a great story for visitors.

According to marine biologist Robin Aiello, "There are more different species of animals and plants in a cubic metre of the Great Barrier Reef, than in any other environment in the world – including tropical rainforests. In fact, some reefs in the Great Barrier Reef have more different fish types than in the entire Caribbean Ocean."

FACTS	HOW TO TELL THE STORY
1500 of the world's 13 000 species of marine fish (just over 10 per cent)	Put it into perspective... It's possible to find as many as 200 different types of fish in just one hectare on the Reef.
360 species of hard corals	Make complex examples simple... The association between corals and microscopic algae living within the coral tissue is one of the most important relationships on the Reef. The algae provide coral with food and their normal healthy colour. The corals, in return, supply the algae with certain nutrients.
600 species of echinoderms (starfish, sea urchins, sea cucumbers)	Use examples that are stranger than fiction... One type of sea cucumber has the amazing ability to turn into a liquid substance when handled and pull itself together again when it's left undisturbed.
629 species of seaweed	Relate it to things people know about... Seaweeds contain many substances useful to humans. Some are used in ice cream, instant puddings, salad dressings, printer ink, cosmetics, pharmaceuticals and to coat pills.
6 of the world's 7 species of marine turtles	Talk about animals people are familiar with... The temperature of the sand around the turtle nest determines the gender of sea turtles. Generally sand with a temperature more than 28°C produces mostly females, while cooler sand produces males.
215 species of birds	Talk about things you're likely to see... Boobies are large seabirds that have adapted to cope with plunging from great heights to catch fish. They have shock absorbers built into their heads to reduce the effects of hitting the water beak first.
14 000 dugongs	Point out relationships... Dugongs are more closely related to elephants than they are to other marine mammals such as whales or dolphins.
130 species of sharks and rays	Relate it to science... Epauvette sharks have a special "switch" in their brains to enable them to survive when oxygen levels in the water decrease. Scientists are studying them to see if this process can be used to help stroke victims.



Setting the scene... an update on the age of the Reef

We have sourced the latest information available on the age of the Great Barrier Reef. Stay tuned though, because we're expecting this information to change as more research is undertaken.

These are the significant dates you should be talking about when explaining the age of the Great Barrier Reef:

- While corals have existed on the Great Barrier Reef for as long as 25 million years, they didn't form large structured reefs like those we see today.
- The earliest record we have of complete reef structures (like those we see today) is from 600 000 years ago.
- The current Great Barrier Reef structure started growing on top of the old reef platform about 9000 years ago when the sea levels rose at the end of the last Ice Age.

Many of the places that support reefs today were part of the land during the last ice age, which ended about 20 000 years ago.

As global temperatures increased, the ice melted and retreated to the poles and mountain tops. Sea levels rose to their present levels about 6000 years ago, creating ideal conditions for corals to develop along the tops of former low coastal hills.

The Great Barrier Reef comprises about 2900 separate reefs off the coasts of the islands and the mainland, and barrier reefs facing the sea. The outer Reef lies along the edge of the Australian continental shelf.

Turtles and sharks are the marine 'dinosaurs' of the Reef. Turtles have been swimming around in its waters for 150 million years, while sharks have been around for about 400 million years – that's 100 times longer than humans.

How are coral reefs formed?

Reefs are masses of limestone made from skeletons of millions upon millions of tiny marine animals and plants.

Colonies of tiny, living coral polyps grow on a reef's surface. These animals are the main reef builders. They extract dissolved limestone from the water and, with the help of single-celled plants (called zooxanthellae) living inside them, lay it down as hard limestone around the lower half of their bodies.

Polyps can pull their whole bodies inside these limestone cups for protection, if necessary. The combined skeletons of many colonies of polyps form the large corals that can be seen on reefs.

When coral polyps die, their limestone skeletons and the remains of other animals and plants are added to the framework of the reef.

When is a reef not a reef?

Only about six per cent of the area of the Great Barrier Reef World Heritage Area is taken up by coral reefs. Islands also represent a small proportion, and most of the remaining 95 per cent is seabed between reefs.

This seabed is ecologically complex and comprises many different types of habitat but, generally, can be divided into the inter-reef area and the lagoon.



Why is the ocean salty?

Most seawater has a salinity level (salt content) of about 35 parts per thousand or 3.5 per cent. Apart from sodium chloride (common salt), sea salt contains 44 other elements including magnesium, calcium and even traces of arsenic and gold.

Some salt comes from undersea volcanoes, but most comes from the land. As rain falls, salt contained in rocks is dissolved and rivers eventually carry it to the sea.

There is sufficient salt in the sea to cover all the land in the world in a layer 150 meters thick.

Why is the ocean blue?

There are two reasons for the ocean's blue colour. First, as water reflects and scatters light that strikes it, when the sky is bright and blue, so is the ocean. Second, blue light is more easily bent (or refracted) than red light; thus, light refracted back from the surface of the sea appears blue.

Want to find out more?

The Great Barrier Reef Marine Park Authority (GBRMPA), in consultation with the marine tourism industry, developed the Reef Discovery Certificate Course as a general introduction to reef biology, ecology and management. This course can be run anywhere in the Great Barrier Reef region.

The Reef Discovery Certificate Course was developed to provide tourism staff with information and basic interpretive methods to better inform visitors about the biology and management of the Great Barrier Reef.

To find out more about the Reef Discovery Certificate Course, contact Lorelle Schluter in the GBRMPA's Tourism and Recreation Group on (07) 4750 0705 or by email: l.schluter@gbrrmpa.gov.au.

Confessions of a reef guide

The Reef's incredible complexity and biodiversity means that there's a staggering amount of facts and statistics to share with visitors.

But what's the best way to get this information across without seeing their eyes glaze over? Here's some useful suggestions from three highly experienced marine tourism guides, all of whom work for, or are, Ecotourism Australia EcoCertified tourism operators:



ROBIN AIELLO, marine biologist, National EcoGuide Assessor (Ecotourism Australia) and accredited trainer for GBRMPA:

"Instead of just reciting numbers, I take the information and put it in a perspective that reveals the Reef's amazing diversity. For example, I tell our visitors that there's only 900 species of marine fish in the Caribbean, compared to the 1500 species found in the Great Barrier Reef.

"We all know the length of the Great Barrier Reef so I take this piece of info one step further and put it into terms that the visitor can better relate to. For instance, the Reef covers more than 348 000 kilometres². How many football fields is that?

"In brief: compare, keep it short and sweet, provide five facts at a time, don't overkill, avoid convoluted sentences, present the material with passion, make facial expressions and act things out."

STEVE ROWLAND, owner/operator Magnetic Island Sea Kayaks:

"Turn 'technic-ese' into English, make it basic. For example, use simple words such as 'lava' rather than 'magma.'



"It's not just a matter of regurgitating facts, you have to weave them into a story that is interesting to people.

"I try to provide the information in stages, throughout the tour, rather than bombard my clients with it all at once. Each piece of info is like a building block.

"Don't overwhelm your client with too many facts and figures. The last place people want to be is in a physics classroom!"

DEAN MILLER, marine biologist, and former Undersea Explorer employee. Dean now works for the GBRMPA:

"Focus on the things that people are more likely to see in the area that they're visiting, such as turtles. This avoids raising their expectations.



"Compare the underwater world with things on land. For example, when you're explaining the structure of the Reef with its pinnacles and gullies, liken it to the Cairns-Townsville mountainscape, saying it's the same vista underwater.

"Relate the material to human relationships and situations. For example, with the relationship between the male and female clownfish, I tell them that the female – which is larger than the male – henpecks and harasses the male, to the extent that it affects his hormone levels and he's unable to turn into a female like most species of other male fish do. This always gets a laugh from the couples in my groups."

(If you relate this back to the movie "Finding Nemo", it means Nemo's father should have turned into his mother!)

"Act the content out and be very animated with lots of hand gestures. For example, if you're talking about a potato cod and the way its mouth snaps open, act out the snapping jaw.

"If you don't know the answer, admit it, don't make it up! Say you don't know and you'll get back to them. I've even seen some guides make up species' names!"

Well worth a look

Our featured guides recommend:

Tropical Topics by Stella Martin, a CRC Reef Research Centre publication

Coral Reef Animals of the Indo-Pacific by Gosliner, Behrens & Williams

The new version of GBRMPA's *Tourism Operator's Handbook* (and we didn't ask them to say this!). Check out www.tourismoperators.reefhq.com.au

Fishes of the Great Barrier Reef & Coral Sea by Randall, Allen & Steene

Your contributions, ideas and feedback are welcome. Contact Lorelle Schluter in GBRMPA's Tourism and Recreation Group by phone (07) 4750 0705 or email: l.schluter@gbmpa.gov.au.