

OUR PACIFIC OCEAN, OUR STORIES

The challenges our coral reefs face



Coral reefs support an estimated 25 percent of all marine species in the world.

Cakaulevu barrier reef, Fiji © Stuart Chape

For those marine species, coral reefs provide spawning, nursery, refuge and feeding areas.

Coral reefs are also important for humans, especially Pacific islanders who depend on them for income, food, livelihoods, coastal protection and cultural identity.

Many small and large island communities rely heavily on fisheries as a food and economic resource, but did you know that there are different types of coral reefs that provide unique environments all over the Pacific? Let's take a look at the different types of coral reefs!

The three main types of coral reefs are:¹

Fringing reefs are the most commonly found reefs, which grow seaward from the coastlines of land masses such as islands. A shallow and narrow lagoon sometimes separates the main reef from the shore.

Barrier reefs surround island coastlines and parts of continents, at varying distances from the shoreline up to several kilometres, and water often depth of several dozens of metres. The New Caledonian barrier reef and Fiji's Cakaulevu barrier reef are famous barrier coral reefs in the Pacific.

Atolls are formed when a volcanic island subsides completely below sea level, while the fringing reef continues to grow seaward and upward, creating low-lying islands. Atolls are usually circular or oval shaped, with a lagoon in the centre. Parts of the reef platforms may emerge as one or more islands, while gaps in the reefs provide access to the central lagoon. Kiribati and Tokelau are examples of groups of atoll islands.

¹ National Oceanic and Atmospheric Administration. How do Coral Reefs Form? NOAA's National Ocean Service. https://oceanservice.noaa.gov/education/tutorial_corals/coral04_reefs.html. Accessed 2018 Aug 21.

Challenges faced by Our Reefs

- **Climate change** is causing oceans to warm resulting in coral bleaching, as well as strong El Niño events that increase sea surface temperature events. When the water is too warm, zooxanthellae which give the corals their vibrant colours, expel themselves from the coral tissues, exposing the colour of the white skeleton.² Coral reefs tolerate temperatures ranging from 20–30°C and in the Pacific most corals live in waters of 26–29°C. Even a slight rise in temperature can impact the reefs.³ A recent study shows that it takes five years for reefs to recover from a bleaching event and as these events become more frequent and the duration of each event becomes longer, corals are having a difficult time recovering.⁴
- **Ocean Acidification** is changing ocean chemistry and making it unsuitable for corals to live in. The ocean absorbs about 30 percent of the CO₂ that is released in the atmosphere, and as levels of atmospheric CO₂ increase through the burning of fossil fuels, so do the levels in the ocean. When CO₂ is absorbed by seawater, a series of chemical reactions occur resulting in the increased concentration of hydrogen ions. This increase causes the seawater to become more acidic and causes carbonate ions to be relatively less abundant. Carbonate ions are an important building block for structures such as sea shells and coral skeletons. A lower concentration of carbonate ions will negatively impact coral reefs and the situation is predicted to get worse as more CO₂ is dissolved in the ocean.⁵
- **Development** on land can have effects on the life below water. Forest and mangrove clearing creates nutrient overload and increases sediment levels, smothering seagrass and corals. Tree roots and vegetation hold together sand and soil, once they are removed erosion can cause soil to be washed into the sea. Coastal development such as building for beach fronts, sand mining and seawalls affects the natural movement of sand, exposing the land to erosion, which breaks away parts of the coasts.
- **Destructive tourism** has lasting impacts on coral reefs. Anchoring, touching or walking on corals breaks and removes a protective layer of mucus that the corals create to protect themselves from sunlight. Human activities, such as feeding or disturbance, affect animal behaviour and change the balance in reef ecosystems. As tourism increases, so do human activities, leading to a higher concentration of water and solid waste pollution, development impacts, and introduction of invasive species.
- **Pollution** affects the health of corals from both land and marine sourced pollutants. Without proper treatment or disposal, the pollutants that we create are entangling, smothering and being ingested by corals, such as Styrofoam containers, concentrated animal excrement, unnatural sunscreens, to name a few.
- **Overfishing, destructive fishing and overharvesting** of coral, bêche-de-mer, fish, and other marine species disrupts the balance in coral reef communities. The loss of even one key species can break a link, affecting the food chain, and disturbing the reef ecosystem at large.



Telling our Pacific Stories

Highlight Pacific voices when you tell stories about Our Ocean and Our Reefs. There are many ways to tell a story, but one of the most interesting ways is to write it from your perspective, living on the land and most affected by the challenges. Use your stories, past and present, to show the world a side they don't often get to see.

How much do people know about Our Reefs in your community? This may be your opportunity to help make a difference!

Talk to experts in your community. Find out the local context of issues within your community by talking to local scientists, policymakers, relevant government officers and non-government organisations who work in marine environment conservation.

Establish a strong network of experts in this field who you can call upon for guidance and advice when developing your story, as well as a subject to provide the professional input.

Did you know?

There are numerous islands in the Pacific making this region home to over a quarter of the world's reef, a total of nearly 61,000 km².⁷ This is equivalent to the total land area of Samoa, New Caledonia, Solomon Islands and Vanuatu combined.⁸

Glossary

Bêche-de-mer – processed, dried sea cucumber (class Holothuroidea) is harvested for consumption and considered a delicacy, particularly in Asia and the Pacific.

Erosion – a geological process in which earthen materials are worn away and transported by natural forces such as wind or water.⁶

Overfishing – to fish or exhaust the supply of usable fish.

Overharvesting – taking more from the land or sea before they can be replenished.

Food chain – describes who eats whom in the wild.

Sediment – solid material, usually small pieces of rock, that settles at the bottom of a liquid, carried along and then left somewhere by water, ice, or wind.

Zooxanthellae – are single-celled tiny plant-like organisms that are able to live in marine invertebrates such as corals, clams, worms and other reef organisms. Zooxanthellae absorb light to convert into food, giving the host invertebrates the nutrients they need to grow.

2 National Oceanic and Atmospheric Administration. What is Coral Bleaching? NOAA's National Ocean Service. https://oceanservice.noaa.gov/facts/coral_bleach.html. Accessed 2018 July 10.

3 Secretariat of the Pacific Regional Environment Programme. Coral Reefs & Climate Change. 2009 July. www.sprep.org/climate_change/PYCC/documents/climatechangecoralreef_final_001.pdf.

4 University of Miami. New research predicts the future of coral reefs under climate change. Phys.org. <https://phys.org/news/2017-01-future-coral-reefs-climate.html>. Accessed 2018 Aug 22.

5 National Oceanic and Atmospheric Administration. What is Ocean Acidification? <https://ocean.si.edu/ocean-life/invertebrates/ocean-acidification>. Accessed 2018 Aug 10.

6 National Geographic Society. National Geographic Society Education Programme. <https://www.nationalgeographic.org/encyclopedia/erosion/>. Accessed 2018 Aug 22.

7 Bryant D, Burke L, McManus J, Spalding M. Reefs at Risk: A Map-Based Indicator of Threats to the World's Coral Reefs. World Resources Institute; 1998.

8 Central Intelligence Agency. The World Factbook: WORLD; 2018 June 20. www.cia.gov/library/publications/the-world-factbook/geos/xx.html. Accessed 2018 July 10.