



Coral reefs are ancient, living organisms, which have seen and adapted to many changes over millions of years. It's one of the oddities of the human race that we expect natural systems to be constant, but as the climate and environment alter, so do reefs around the world, and those in Fiji are no exception.

Fiji's Resilient Reefs

As you travel around Fiji you will soon come to realise that there are many types of reefs – spectacular hard coral walls, colourful soft coral bommies, dramatic and spooky rocky passages, rubble patches filled with weird and wonderful critters. What you may not realise is that these reefs change year by year, react to pressures in many different ways, grow and adapt like any other natural ecosystem.

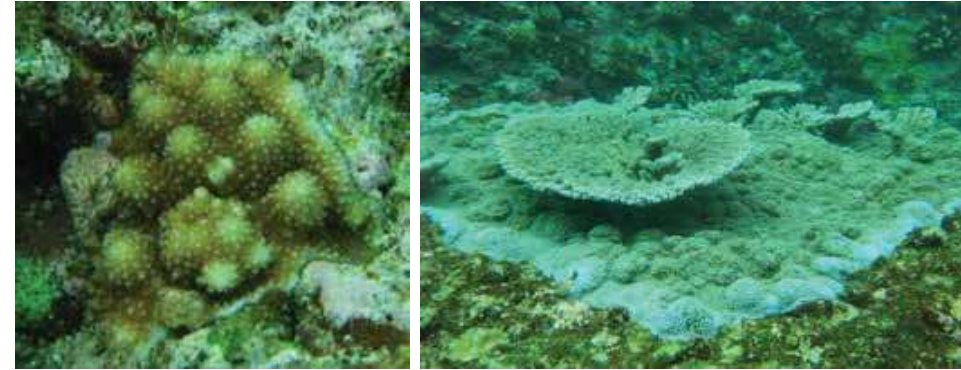
Scientists surveying reefs around Fiji for almost 20 years have recorded many kinds of events that impact the reefs in different areas, and in turn seen

how these reefs recover and change after such events. Things that can affect the amount of live coral on a reef include cyclones, outbreaks of coral-eating Crown of Thorns Starfish, overfishing of key reef-cleaning organisms such as Sea Cucumbers, and sea water temperature rise which leads to coral bleaching. What is remarkable about Fijian reefs is the speed at which they can recover and restore themselves.

2014 – 2016 were rough years for many reefs in the South Pacific. As well as high water temperatures and Crown of Thorns Starfish outbreaks, Cyclone Winston broke up many shallow corals in its path

Above: New coral growth on reefs tops in the Vati-i-Ra Passage

Story & photos by Helen Sykes | Marine Ecology Consulting | www.marineecologyfiji.com



*Above left: Newly settled coral less than a year old.
Above right: Acropora table coral re-grows over an old reef skeleton in the Vatu-i-Ra Passage.*

across Fiji in February 2016. Thankfully, 2017 has been more favourable, and it is amazing to see how quickly new coral growth has started on affected reefs.

This is thought to be due to good water quality (Fiji is FAR away from sources of large-scale pollution), high biodiversity (Fiji has more than 1,000 species of reef fish and over 340 coral species) and the wide range of reef systems across the country (it is rare for any coral-damaging event to affect all our reefs at the same time, so there are always healthy corals surviving to spread new coral spawn to affected areas).

Many branching, finger and table corals can grow more than 5 cm a year, and so any small coral colony smaller than your closed fist is probably new coral that arrived after the cyclone.

Reefs in Northern Fiji

During May 2017 surveys by Marine Ecology Consulting, the Wildlife Conservation Society (WCS) and the Vatuvara Foundation in Northern Lau, we saw immense reef walls in the clearest waters found in Fiji, where corals in one section, broken into rubble during the cyclone, were immediately next to pristine walls of spectacular hard corals which had survived unscathed. In other areas, corals that are normally very sensitive to high water temperatures were healthy and prospering in very warm water,

Right: Stuart Gow of Marine Ecology Consulting uses a quadrat frame to record coral settlement

giving a positive indication that corals in Fiji are adapting to water temperature rise. (See National Geographic Ocean Views blog <http://voices.nationalgeographic.com/blog/ocean-views/> and search for "Coral reefs in Northern Lau".)

In the Vatu-i-Ra Passage and on the Namena Barrier Reef, south of Vanua Levu, hard corals on the shallow reefs tops broke during Cyclone Winston, but flexible soft corals and sea fans were able to ride out the storm, and fish life was teeming around the reefs.





Above: Baby Coral Gallery - Taveuni, July 2017. Below left: New coral growth on reefs tops in the Vati-i-Ra Passage



New hard coral growth was already starting to cover old skeletons, but the most exciting thing was to see thousands of newly settled “baby” corals all over the bare rock tops, as coral spawn broadcast in October and November took advantage of the newly cleared spaces to settle and grow. We counted the new corals under a frame, and in some areas there were more than 30 new corals per square metre of reef top.

On the shallow reefs fringing Taveuni Island, coral rubble from the storm is already consolidating into stable substrate and being colonised by new corals. In some places, hills of this rubble are protecting branching coral gardens behind them from strong waves, and newly settled baby corals can be found starting to reclaim the sea beds.

All corals pictured were less than 10 cm (4 inches) across in July 2017, probably less than two years old, and have appeared since the cyclone of February 2016. They are worth searching for, as with an average growth rate of 5 cm (2 inches) per year, they won't stay this tiny for long,



Above: Sinularia soft coral colonising old hard coral habitat at Honeymoon Island, Taveuni.

Changing Reefs - Hard to Soft

Not all corals make hard calcium skeletons, some make leathery skins instead. Once such is Sinularia leather coral, which forms large gardens resembling golden wheat-fields, notably at North Save-a-Tack Passage in the Namena Barrier Reef, and at Honeymoon Island in northern Taveuni.

Flexible soft corals have a survival advantage over brittle hard corals during strong waves, and may come to dominate a reef after a cyclone, taking the opportunity to extend their territory in a process called a “phase shift” from a hard coral to a soft coral habitat. As you can

see in the photo, many fish don't seem to mind the change at all.

So, as you dive and snorkel around the reefs this year, look closely, and see how many new corals you can see. It's an amazing time to watch the reef literally “re-cover” itself. ■

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Coconut Grove Beachfront Cottages, Taveuni | coconutgrovefiji.com

Nai'a Dive Liveaboard | naia.com.fj

Vatuvara Foundation | vatuvara.com

Wildlife Conservation Society (WCS) | fiji.wcs.org