

Coral Odyssey

Coral bleaching is on the rise worldwide, and even the remote reefs of the Maldives are susceptible. But, as marine biologist Carolyn Beasley finds out, the island paradise's many reef conservation initiatives are helping safeguard the seas.

WORDS Carolyn Beasley **IMAGES** Four Seasons, Angsana Velavaru, Outrigger Konotta, Project Regenerate, Olive Ridley Project, Banyan Tree

I'm snorkelling in shallow waters on what should be a pristine coral reef in the Maldives. Although there are some vibrantly coloured fish here, reef ecosystems are underpinned by healthy corals, and this coral has suffered.

This coral has not been smothered during construction, trampled by tourists, or poisoned by sewage. In fact, the assailant here is none other than warm water. The coral has 'bleached,' and some corals have died. These crumbling skeletons covered in green algae reveal what climate change looks like.

As a marine biologist and travel writer, I've had the privilege of snorkelling and diving among some of the world's best coral reefs. However, coral reefs across the planet are under threat now more than ever, and I've witnessed the alarming change first-hand.

The Maldives Context Unusually warm ocean temperatures can be caused by El Niño – the interaction between the ocean and the atmosphere. With the climate changing, El Niño is occurring more often, and its effects are more widespread.

The oceans are absorbing 93 per cent of climate change heat. Lancaster University in the UK studied 100 reefs across 54 countries and in 2016, found that coral bleaching caused damage to 75 per cent of these reefs – an unprecedented event.

Coral reefs are of vital importance, supporting around 25 per cent of all marine life and worth an estimated USD2.7 trillion in tourism and food resources worldwide.

The Maldives is dependent on healthy reefs for its two biggest industries – tourism and fishing. After the 2016 bleaching, researchers

from the University of Exeter, UK, found that while many of the larger 'boulder corals' remained healthy in waters less than 5m deep, 91 per cent of the fragile staghorn and tabletop corals were lost on some reefs.

In the Maldives, the government, resorts and non-governmental organisations (NGOs) acknowledge that addressing climate change will take decades and require global

DYEING EFFECT Corals are colonies of tiny animals. They feed on plankton and farm their own algae (plants) inside their tissues for extra nutrition, and these provide the corals their colour. In overheated water, corals become stressed and eject their farmed friends, losing their colour, becoming white and 'bleached.' If temperatures stay high, corals eventually die.



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Guests at Four Seasons Kuda Huraa release a green turtle into the blue after successful rehabilitation in the resort's marine facility. Maldives is home to five of the world's seven species of sea turtles, including the critically endangered hawksbill turtle and the endangered green turtle.



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political will. However, while they wait for the world to act, they are taking their own localised action to encourage reef recovery.

Rising to the Occasion My snorkel on the shallow reef takes place at Outrigger Konotta Resort where Joan Li, the hotel's marine biologist, explains the resort's coral replanting programme.

Fluent in English and Chinese, Li assists guests to take naturally broken, living coral branches and attach them to steel frames. Wire with a natural soy coating holds the coral in place until the coral forms its own attachment. Around 500 branches have now been planted on 22 coral frames.

Other resorts practise coral replanting too. A pioneer in the

Maldives, Banyan Tree Vabbinfaru, built a marine laboratory in 2004. The hotel boasts a nursery of 1,000 corals while its sister resort Angsana Velavaru supports up to 2,000 corals. Coral fragments at both resorts grow on hanging ropes in deeper, cooler waters and are then transplanted to the house reef, and guests at Angsana Velavaru can get hands-on with the project.

Meanwhile, Angsana Ihuru Resort introduces guests to revolutionary 'electric reefs,' where steel frames on the ocean floor are connected to a low voltage, triggering a chemical reaction that encourages coral larvae drifting in the oceans to settle and grow naturally on the frames.

At Four Seasons Kuda Huraa and Four Seasons Landaa Giraavaru, scientists and guests also build

artificial reefs. Some corals have survived severe bleaching events and biologists now create new colonies from these resilient corals. By simply detaching a branch from a surviving coral and attaching it to a new frame, the scientists are hoping to create 'super corals' that are more resistant to global warming.

Corals also face threats other than global warming. Predatory crown-of-thorns starfish graze on corals, and when reefs are stressed, the numbers of coral-eating starfish can explode, leading to the deaths of whole reefs. At the Banyan Tree Vabbinfaru and Angsana resorts, guests join scientists for a weekly snorkelling session to control these pests; in 2017, more than 3,000 excess starfish were removed.

Power of the People

Empowering communities is one of the effective measures in coral reef conservation efforts in the Maldives.

Save the Beach Maldives

Discarded rubbish and debris often entangle coral reefs, killing them and other animals. Save the Beach Maldives – a local NGO established in 2008 as a youth movement in Villingili Island near the Maldives capital of Malé – works with communities to raise awareness on keeping rubbish out of the ocean, and organising clean-ups on locally inhabited islands. The organisation also assists scientific expeditions, surveying and monitoring reef health. savethebeachmaldives.org

Project Regenerate

Launched in 2013, Project Regenerate is an initiative by the Government of Maldives. The project, which is implemented by the International Union for Conservation of Nature (IUCN) and funded by the United States Agency for International Development (USAID), assists communities and policy makers achieve better self-management of coral reefs. Through hands-on support like educational workshops, Project Regenerate promotes an understanding of factors that stress coral reefs such as climate change, irresponsible waste disposal and coastal developments. The project aims for resilience in the Maldives, both in the ecosystems and within the communities that depend on the reefs. iucn.org



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1. At the Four Seasons Landaa Giraavaru, coral has been propagated on frames and creatively arranged in the shape of a turtle, reminding guests arriving by seaplane that healthy corals underpin all life on the reefs. The resort is cloning heat resistant corals, attempting to develop 'super corals' that may endure global warming. 2. Guests snorkel over healthy coral reefs at Angsana Velavaru while elsewhere at the resort, corals are being replanted to encourage further coral growth. Over 200 species of corals occur in the waters surrounding the Maldives. 3. The writer (left) and resort guests at Outrigger Konotta Resort assist marine biologist Caterina Fattori to build a coral nursery at the resort. 4. At Four Seasons Landaa Giraavaru, guests can join scientists from the Manta Trust charity in a programme called Manta Scientist for a Day. Guests learn to photograph identifying markings on the mantas, contributing to a database used for research purposes.



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Ghostbusters

Discarded or broken fishing nets can drift across oceans, entangling marine wildlife and smothering coral reefs. These 'ghost nets' can come from small- or large-scale fishing, and even illegal fishing. Deadly to turtles, nets often prevent turtles from surfacing to breathe or stop them from finding food, leading to starvation. The Olive Ridley Project is a Maldives-based NGO dedicated to protecting olive ridley sea turtles and other wildlife from the scourge of ghost nets and marine debris. The NGO works in collaboration with Coco Palm Dhuni Kolhu – the only Maldives hotel with a full-time turtle veterinarian on site. As of January, the Olive Ridley Project documented 664 entangled or injured turtles, most of which are of the olive ridley species, and occasionally green or hawksbill turtles. The organisation has removed over 760 ghost nets from the ocean, some consisting of nets jumbled together with ropes, plastic bags, floats and other debris.



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1. Two Maldives anemonefish make their home in an anemone. In this symbiotic relationship, the anemonefish enjoys protection, as predators stay away from the stinging tentacles of the anemone, while the host anemone benefits from the presence of its little residents that eat parasites and carry food in. 2. Project Regenerate assists local communities to develop better strategies for protecting their coral reefs. In this community beach clean, locals learn about the dangers posed by the mismanagement of solid waste, which can smother corals and choke marine animals. 3. Volunteers from NGO Olive Ridley Project disentangle an Olive Ridley turtle from a ghost net. This is one of 664 turtle entanglements documented by the organisation to date. Lost or discarded at sea, ghost nets drift with the currents for years ensnaring marine creatures along the way. Entanglements often lead to suffocation, starvation, amputation of limbs, and, eventually, death. (copyright Dave Bretherton). 4. Banyan Tree Vabbinfaru Resort was the first resort in the Maldives to build a marine laboratory, and is now home to a coral nursery of 1,000 replanted corals. The resort also controls unwanted pests that can destroy coral reefs, like crown-of-thorns starfish.



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All for One While crown-of-thorns numbers have increased, many reef inhabitant numbers have decreased. All animals and plants in the coral reef ecosystem are interconnected and contribute to its overall health, and some species need special assistance to increase their populations.

Sharks are an important part of the reef food chain and need protection as much as corals. The Banyan Tree and Angsana laboratories gather data on sharks, and biologists have deployed 322 underwater GoPro cameras to capture shark footage. Sharks are protected in the Maldives and the data on filmed sharks assists the Government's shark conservation programme.

Another reef resident requiring assistance is the sea turtle. Four Seasons Kuda Huraa Resort

protects turtle nests, with most hatchlings being released under the cover of darkness. A small proportion of hatchlings are kept in the resort's Marine Discovery Centre, graduating to a large sea pen until the age of around 15 months. This gives the vulnerable babies a head start before release, and some are even fitted with GPS trackers to monitor their movements, and gain greater insight into their development.

At Four Seasons Landaa Giraavaru, guests can become a 'Manta Scientist for a Day,' joining biologists from the Manta Trust charity on a research vessel. Visitors help scientists to photograph the manta's identifying spots and markings, with data used to track manta distribution. These manta

rays depend on coral reefs for their habitat, and the programme brings home the conservation message.

A Little Magic While no single resort can save the reef ecosystem of the Maldives, they all contribute to a collective effort. For me, replanting corals, meeting turtles in recovery or swimming with manta rays is inspirational. And by sharing the magic of my experiences, I hope I'm contributing to conservation awareness. 



GETTING THERE

AirAsia flies to Maldives from Bangkok and Kuala Lumpur. airasia.com