

Topic: Sound / Climate change

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Soundscapes can help restore coral reefs

The 'rainforests of the oceans'

Coral reefs are one of Earth's natural wonders (Figure 1). Healthy reefs are a habitat for millions of species, including sea horses, lobsters and sea turtles. The first coral reefs formed 240 million years ago. That's before the dinosaurs were alive. Today's reefs are thousands of years old. Corals attach themselves to the ocean floor so some people think that they are plants or even rocks. In fact, corals are made up of thousands of small animals called polyps. Polyps look like upside down jellyfish. They use their tentacles to catch food from the water. They live in groups called colonies.

Because corals are attached to rocks and don't move, what do some people mistake corals for?



Figure 1. A healthy coral reef in Sulawesi, Indonesia.
© Tim Lamont

There are hard corals and soft corals. Hard corals are the 'reef builders'. They create **exoskeletons** which are a base for other corals. Hard corals also provide homes and carbon dioxide for algae. In return, these simple plants give the coral food and oxygen. Most of the colours that we see in corals come from the algae. This relationship is called **symbiotic**. This means that both living things benefit from living together.

Threatened habitats

Climate change is bad for coral reefs because:

- High levels of **carbon dioxide** gas in the **atmosphere** makes the water more **acidic**. This weakens coral and slows its growth.
- Climate change also brings more storms. This can destroy coral reefs.
- Corals become stressed when water temperature rises. They get rid of their algae and turn white (Figure 2). This is called coral bleaching. Coral can recover from this after a short **heatwave** if there are no more problems.

All types of water pollution are a problem for coral reefs. Surprisingly, lack of fish could also be a problem. Fish have important roles on the reef and can help them recover from bleaching. Fish bring nutrients to the reef. They eat the larger algae which can swamp the coral. Their nibbling shapes the coral and allows more species to thrive. Overall, a coral reef with a variety of fish is more balanced and resilient.

Why do you think that rubbish in the ocean could be a problem for coral reef?

What does the word resilient mean?



Figure 2. Dead coral skeletons after bleaching on the Great Barrier Reef. © Tim Lamont.

Restoring the reefs

Scientists are using their understanding of animal life cycles to try to protect coral reefs. When reef fishes hatch from their eggs, they are tiny. Many are washed away into the deep sea. Once the fish have grown, they can return to the reef - but only if they can hear the reef. Healthy coral reefs are really noisy places! Turtles crunch. Shrimps snap their claws. Fish chatter, buzz and grunt. Sounds travel far under water and so fish can find their way back to healthy coral reefs.

How do fish miles away find their way to coral reefs?

Dr Tim Lamont (previously Gordon) built underwater microphones (Figure 3) to test the effect of sounds on fish. In some places he played the sounds of a healthy coral reef. In other places he played the quieter, reduced sounds of damaged coral reef. Then he measured the number of fish and biodiversity in all areas.

He found that there were 40 % more fish at the places playing the healthy reef sounds with 25 % more **biodiversity** at these sites too.

New research like this could help the coral reefs to recover. When discussing his findings Dr Tim Lamont says, "As we look to the future, let's learn to listen!"

Why do you think that Dr Tim Lamont chose the words 'learn to listen'?

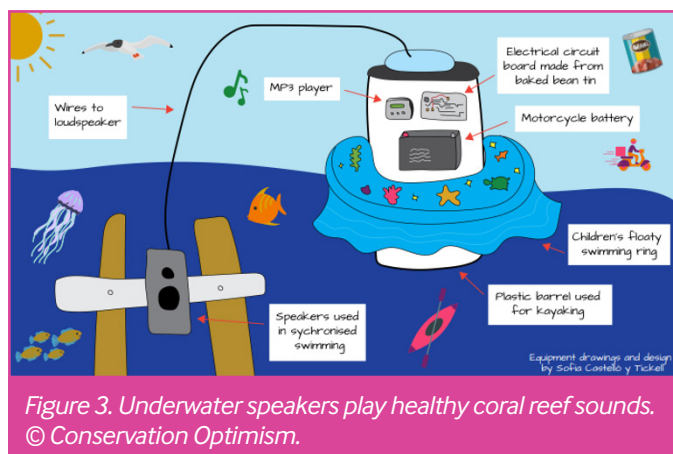


Figure 3. Underwater speakers play healthy coral reef sounds.
© Conservation Optimism.

Can you use your voice to help other people to 'learn to listen'?

We can all help the coral reefs. Think about which of these challenges you can do easily. Which might be more challenging to achieve? Who could help us?

1. Pick up litter. If left on the streets, it will often get blown into rivers and drains. It could then end up in the sea.
2. Avoid plastic by using a refillable bottle for drinks and reusable bags and containers.

3. Don't waste water. This will mean that less wastewater will end up in the ocean.
4. Find out if your school uses energy efficient light bulbs. Can any improvements be made? This is an easy way to reduce emissions of **greenhouse gases** like carbon dioxide and stop the oceans from becoming more acidic.

Glossary

acidic – having the properties of an acid, a substance (usually a liquid) that can react with other substances. Some acids burn or dissolve other substances

atmosphere – the layer of gases surrounding the earth or another planet

biodiversity – the number of different species found in one area (an ecosystem)

carbon dioxide – a colourless gas with no smell that is naturally present in air. It is made from carbon and oxygen

climate change – a long-term change in the average weather patterns on Earth

exoskeleton – a hard covering on the outside of some types of animals, an 'outside' skeleton that supports and protects the body

heatwave – at least three consecutive days of unusually hot weather

greenhouse gas – a gas in the Earth's atmosphere that traps heat and contributes to global warming, e.g. carbon dioxide, water vapour, methane

sympiotic – a relationship where different types of living things exist together in a way that may benefits them all

The paper that inspired this work was:

Acoustic enrichment can enhance fish community development on degraded coral reef habitat.

By Timothy A. C. Gordon, Andrew N. Radford, Isla K. Davidson, Kasey Barnes, Kieran McCloskey, Sophie L. Nedelec, Mark G. Meekan, Mark I. McCormick & Stephen D. Simpson.

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Investigations for children are described in the Teacher Guide which can be accessed [here](#).