

## Recipe for rescuing our reefs



**VIEWPOINT**  
Rod Salm

**The colourful world supported by coral reefs is under threat as oceans absorb greater quantities of carbon dioxide, says Rod Salm. In this week's Green Room, he says we must accept that we are going to lose many of these valuable ecosystems, but adds that not all hope is lost.**

“ I've been privileged to see many of the world's finest and least disturbed reefs. Mine were the first human eyes to see many of the remotest reefs at a time when we really could describe them as pristine.

I would never have dreamed that they were at risk from people, far less than from something as remote then as climate change.

Today, despite the doom and gloom one reads so much about, one can still find reefs that are vibrant, thriving ecosystems.

But sadly, too, there are more and more that look like something from the dark side of the Moon.

These degraded reefs have been ravaged by destructive fishing, bad land use practices that smother them with silt, and pollutants that foster disease and overgrowth by seaweeds. More alarmingly, there are large areas that are killed off and degraded by warming seas linked to climate change.

We've all read that global warming poses a tremendous threat to our planet, and that coral reefs will face an uphill battle to survive in warmer waters.

Yet the greatest threat to our oceans and to all of its wonders is little known, nearly impossible to see, and potentially devastating. This is not climate change, but does stem from the excess carbon dioxide emissions that contribute to climate change.



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## Changing chemistry

The ocean absorbs about one-third of the CO<sub>2</sub> entering the atmosphere - a natural process that for millennia has maintained the carbon balance of our planet. In recent times we have upset this balance; global CO<sub>2</sub> emissions are at an all-time high, and our oceans are absorbing more CO<sub>2</sub> and at faster rates than ever before, causing a shift toward greater acidity.

This removes carbonate from the water; and carbonate is an essential building block for calcifying organisms, like corals, molluscs, sea urchins and many other important creatures that live on reefs or help to build them.

Too much carbonic acid lowers the natural pH balance of the oceans, causing acidification, which wreaks havoc on marine habitats and species.

Just imagine all the colour and vibrancy of coral reefs fading away into fuzzy, crumbling greys and browns, and you're left with a coral graveyard that could become the norm if we don't address the threats to our oceans.

We need to find ways to convince people to take action, but that is a major challenge. Given the difficulties that many coral reef managers around the world have in controlling such pressing direct threats as destructive fishing, overfishing and pollution, they are understandably hesitant about taking on an issue that they feel is beyond their ability and mandate to tackle.

Climate change is often seen as too daunting and too global for them to address, and too abstract for them to communicate.

Fortunately, in some respects, the sudden and startling onset of mass coral bleaching linked to warming seas has changed that a little.

We have developed and are applying some straightforward, practical actions to design marine protected networks and zone the

individual sites to protect areas that are naturally resistant to bleaching

These areas are key, as they provide larvae that are transported to more vulnerable reefs where they settle and enhance recovery.

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It is creeping, progressive, and insidious - likened by some scientists to osteoporosis of the reef - a weakening of the reef structure that makes corals more vulnerable to breakage from waves and human use.

We simply do not know yet whether we have reached or surpassed the point of no return for some coral species.

If current emission trends continue, we could see a doubling of atmospheric CO<sub>2</sub> in as little as 50 years.

This would lead to an unprecedented acidification of our oceans that coral reefs would be unlikely to survive, a scenario that should spur us into action to try and find solutions.

A significant lowering of ocean pH would mean potentially massive coral loss.

That would lead to the death of countless marine species as well as the devastation of economies dependent on ocean health and productivity.

### **'Meeting of minds'**

It would also mean the end of an era for coral reef and scuba diving aficionados around the world.

But, more importantly, it would remove the livelihoods of hundreds of millions of people around the globe who depend on reefs for food, income, coastal protection and stability.

Current estimates predict that we could lose all coral reefs by the end of the century - or, in the worst case scenario, possibly decades sooner, if we don't take action now to prevent ocean acidification.

We have to maintain hope and optimism and keep trying to find solutions.

The Nature Conservancy recently convened leading climate change experts, top marine scientists, and prominent coral reef managers from around the globe for a "meeting of the minds" session to chart a course of action for addressing ocean acidification.

The key findings and recommendations from this gathering were compiled into the Honolulu Declaration on Ocean Acidification and Reef Management.

The most logical, long-term solution to ocean acidification impacts is to stabilise atmospheric CO<sub>2</sub> by reducing emissions around the globe.



['Alarming' plight of coral reefs  
Natural lab shows sea's acid path](#)

Yet the Honolulu Declaration also outlines tangible steps that can be taken now to increase the survival of coral reefs in an acidifying ocean, while also working to limit CO2 emissions.

For example, we need to identify and protect reefs that are less vulnerable to ocean acidification, either because of good flushing by oceanic water or biogeochemical processes that alter the water chemistry, making it more alkaline and better able to buffer acidification.

We can achieve this protection by designating additional "marine protected areas" and revising marine zoning plans.

We also need to integrate the management of these areas with reform of land uses that generate organic wastes and effluents that contribute to acidification.

At the local level, we may need to restrict access to more fragile coral communities or limit it to designated trails, much as we do with trails through sensitive environments on land.

We should consider designating "sacrificial" reefs or parts of reefs for diver training and heavy visitor use.

Another intriguing option is the prospect of farming local corals that prove more resistant to acidification, and "planting" them in place of those that weaken and break apart.

The consequences of inaction are too depressing to contemplate.

Global leaders, reef managers, and citizens around the globe should give all the support they can to the Honolulu Declaration to ensure the survival of the beauty and benefits of our marine treasure trove for future generations. ”

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*The Green Room is a series of opinion articles on environmental topics running weekly on the BBC News website*