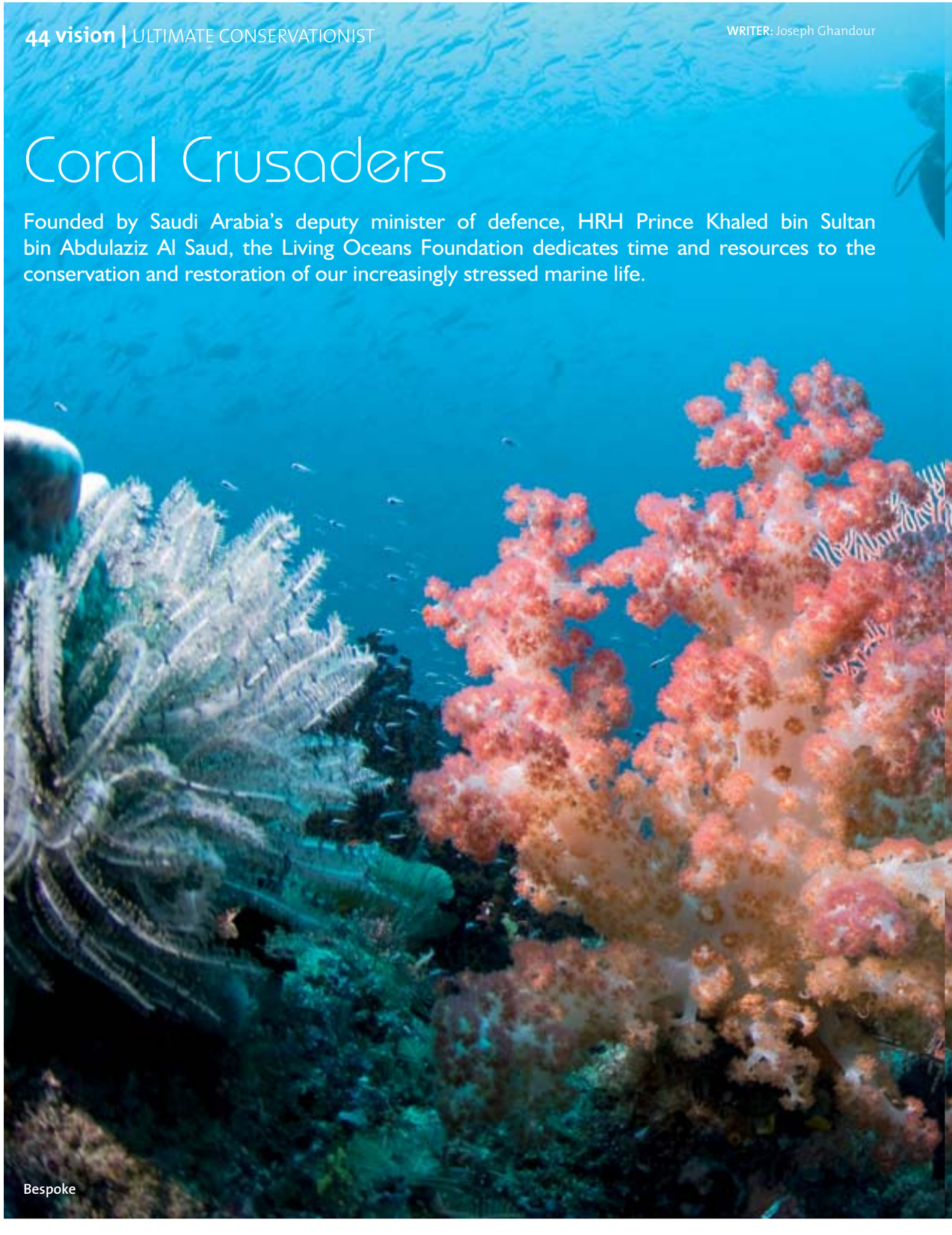
WRITER: Joseph Ghandour



# Coral Crusaders

Founded by Saudi Arabia's deputy minister of defence, HRH Prince Khaled bin Sultan bin Abdulaziz Al Saud, the Living Oceans Foundation dedicates time and resources to the conservation and restoration of our increasingly stressed marine life.



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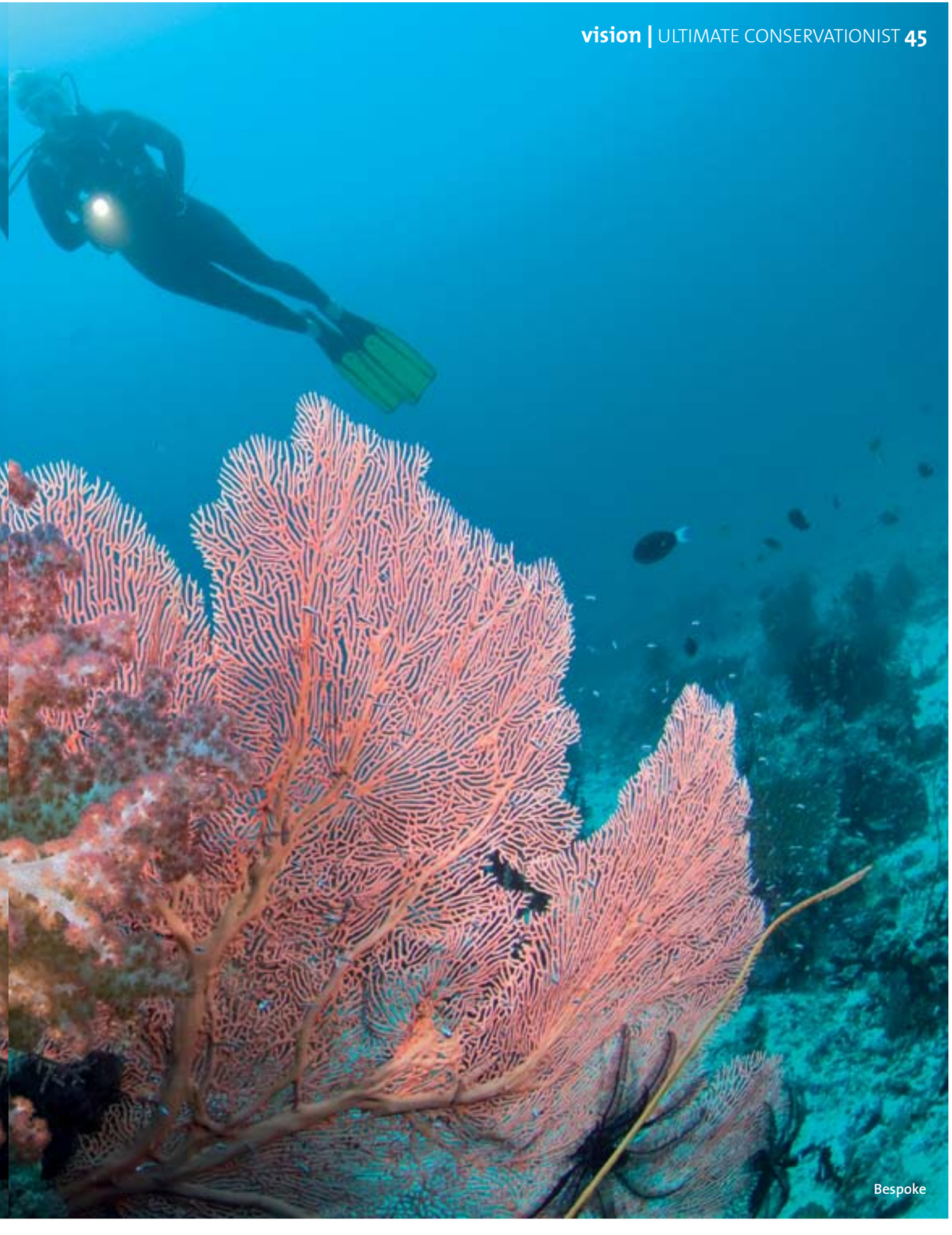

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**Left:** The Global Reef Expedition, which started in 2011 and is expected to finish in 2016 will provide the opportunity to study coral reefs all around the world. Information obtained will assist in identifying sites of high priority for protection and in developing conservation strategies for these precious resources.

Writing in the New York Times in 1904, Cyrus Adams announced that less than a fiftieth of the earth's landmass remained to be mapped. In more comprehensible terms, it amounts to an area slightly larger than Canada.

A century or so later, Adams would undoubtedly be cheered to find that there's almost nowhere that hasn't been mapped. Although in 2008, Google Earth discovered a new mountain range in Mozambique, so there may be a few surprises left out there yet.

This is probably why, when it comes to unexplored frontiers, our thoughts turn to the stars, even though there's an entire world we know almost nothing about, right on our doorstep.

The oceans cover seventy per cent of the planet's surface, account for at least half of all the known species on earth, provide us with oil, gas, minerals and 20 per cent of the protein we eat as well as 50 per cent of the oxygen we breathe. Despite all this, in 2012, ninety per cent of the ocean floor remains terra - or in this case, mare – incognita.

Does this matter? Well, yes. Beyond that embarrassing fact that we know more about the surface of the Moon than we do about ninety per cent of that seventy per cent of our own planet's surface, there's also the fact that with the world's oceans under threat, there's much about that ninety per cent we may never get to know.

Enter the Living Oceans Foundation. Located in an unassuming office suite in Landover, Maryland, a quiet commuter town on the northern fringes of Washington DC, there's little about it beyond its name to suggest what this private research institution is engaged in, let alone that one of its missions may be the most ambitious of its kind ever conceived.

That would be the Global Reef Expedition, a five-year mission to explore and exhaustively map the state of the world's coral reefs and the life they support. The survey is based on a series of 22 sites in the Caribbean, Pacific, Indian Ocean and Red Sea, which have been selected for their diversity, both in terms of habitats and the threats they face. The goal is to create a snapshot of global coral health - detailed maps, coral types and the kinds of marine life present - circa 2011-2016 as a benchmark against which future generations can measure their progress. If, that is, there are any coral reefs left to monitor by then.

"It's really difficult to believe that the coral reefs will exist in fifty years or a hundred years from now in the manner that they do today," explains Captain Phillip Renaud, a U.S. Navy veteran and now Executive Director of the Foundation.

As used as we have all become to predictions of natural demise – after all, if you follow the Mayans, the world is supposed to end halfway through this issue's shelf life - the Captain has me startled. He goes on to explain that one of the major problems facing the reefs, beyond the stresses from natural disasters like hurricanes or from pollution and over-exploitation, is the ocean's rising acidity level, the result of absorbing the carbon we are busily pumping into the atmosphere.

"Some of what's predicted is a disruption of the phytoplankton that create the oxygen we breathe and for the corals, there's great concern because the acidity affects their whole calcification process," he continues. "We have set the wheels in motion for what's going to be a very long re-equilibration process."

While the Foundation's work is global, it has close ties to the region. It was founded in 2000 by HRH Prince Khaled bin Sultan, who saw the need for a private non-profit organisation dedicated to conserving and restoring the oceans that could operate independently. Non-governmental and non-judgemental, all the Foundation's work falls under the banner of 'science without borders' - again one of the prince's initiatives - and its aim is to undertake the kind of research that will provide everyone concerned, from ministers and developers to fishermen and tourists, with the information they need to make responsible decisions.

"We're not out to damage a country's reputation or affect their tourism through bad publicity," continues Captain Renaud, "We try to strike this balance of providing objective information and letting them do what they want with it."

Free from the agendas that influence government-funded work and not subject to the peer pressure that informs academic research, the Foundation is able to pursue the kinds of projects that others cannot or will not. "Independently financed science is rare," adds Allison Barrat, a marine scientist and documentary filmmaker who also oversees the Foundation's media relations. "Our funding is very generous but the information that comes out of that funding is what is really valuable."

Information is, ultimately, the goal, as is filling in the many gaps in marine science in general and coral science in particular, which➤

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as a separate discipline, is barely forty years old. One gap would be learning how to help reefs regenerate. Beyond acidification, there's the impact of rising temperatures. Living coral relies on a symbiotic relationship with algae that lives within its folds to produce eighty per cent of its food. The algae produce nutrients through photosynthesis, so when temperatures rise, as they have in recent decades, the algae go into overdrive, producing not only more nutrients but also more oxygen, a byproduct of the process. Absorbing oxygen leads to a build-up in body tissues of oxygen radicals, which degrade cells, eventually killing them and causing disease and aging. Ironically, the very gas we depend on to live kills us in the end. This also applies to corals, the difference being that when they sense the increase of radicals, they assume the algae are hostile and expel them, losing their primary source of nutrients. The result is called 'bleaching'.

"We didn't see this happen until the late 1970s, early 1980s," Captain Renaud continues. "Then all of sudden, we saw this shocking condition where entire coral reefs turn white because they've expelled the algae and the algae is what gives the coral its colour. It's still alive, so it can eat, but it's only getting up maybe to 20 per cent of its needs so it's got to get that algae back in order to get the photosynthesis happening again."

Luckily, this can happen naturally. Through a process called 'reinfection', corals readmit the algae and begin to revive. But for reinfection to happen, the climatic imbalance has to be rectified, which isn't always happening. Hence, the Captain's grim prediction.

Why does any of this matter? Coral occupies a tiny part of the planet's surface and according to research, reefs have died off many times in the past, only to return when conditions were once again right. "It's true that area-wise, coral reefs occupy less than one per cent of the oceans," Renaud says, "but they support nearly twenty-five per cent of fish life in the oceans. That's why reefs are described as the underwater analogue of the rainforest."

In other words, if reefs collapse, a significant swathe of aquatic life could go with them. Such a fundamental challenge to the marine ecosystem would put livelihoods at risk everywhere. The results would be potentially devastating.

I walk to the train with almost as many questions as I had when I first walked through the Foundation's doors. Something Allison said earlier echoes in my thoughts. I'd asked her, devil's advocate style, why the oceans were so important in the first place. After all, we live on land. "Just look at that question backwards. Everything on earth, including us, evolved in a world that is two-thirds water. In that case, why wouldn't the oceans be important?" B

**WHAT** Living Oceans Foundation
**ESTABLISHED** 2000
**DETAIL** Prince Khaled allows the Foundation to use his entire Golden Fleet: the 80m Golden Odyssey superyacht, the 67m Golden Shadow support vessel, the seaplane Golden Eye and the 30m Golden Osprey sportfisher.
**WHY** The Foundation's significant though under-celebrated work is helping humankind safeguard the world's oceans.