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# The Oceans Can't Protect Us Anymore—Here's Why

Our waters have borne the brunt of global warming for decades, but dying corals, extreme weather, and plummeting fish stocks are signs that it can handle no more.

A local fisherman and his son travel in a traditional outrigger canoe above a coral reef in Papua New Guinea's Kimbe Bay. Almost all coral reefs may experience bleaching by 2050, the new report says.

PHOTOGRAPH BY DAVID DOUBILET, NATIONAL GEOGRAPHIC CREATIVE

By **Christine Dell'Amore**

PUBLISHED SEPTEMBER 5, 2016

HONOLULU, HAWAII—The oceans, which have borne the brunt of most of global warming, have finally hit their limit as dying corals and plummeting fish stocks signal that the seas are at a dangerous tipping point, according to the broadest ever look at the issue. And people are already experiencing direct consequences, such as more extreme weather events, including hurricanes, says the report, released by the International Union for Conservation of Nature.

"We all know the oceans sustain this planet," says Inger Andersen, IUCN's director general, "yet we are making the oceans sick."

Since 1970, global waters have been a "powerful ally" against global warming, absorbing 93 percent of the carbon dioxide released by human activities. (See "Ocean Warming Faster Now Than in 10,000 Years.")

"Without this oceanic buffer, global temperature rises would have gone much, much speedier," Andersen said Monday at the IUCN World Conservation Congress.

To put it bluntly, if the oceans weren't there to protect us, our lower atmosphere would have already heated up by 36 degrees Celsius, says Dan Laffoley, principal advisor of marine science and conservation for IUCN's Global Marine and Polar Programme.

The sex ratios of sea turtles, such as this hawksbill, may shift as the oceans warm. A turtle hatchling's sex is determined by the temperature at which the eggs develop in the nest, with higher temperatures favoring the production of females.

PHOTOGRAPH BY DAVID DOUBILET, NATIONAL GEOGRAPHIC CREATIVE

## Troubled Waters

Now, as global warming continues apace, the ocean will continue to warm by between 1 to 4 degrees Celsius by 2100, Andersen says. "In an ecological timescale, 2100 is tomorrow."

Eighty scientists from 12 countries contributed to the "most comprehensive, most systematic study we've ever undertaken on the warming of the oceans," Laffoley says.

"We've looked from microbes to whales, from pole to pole, we've looked at all the major ecosystems, including the deep ocean," he says. (See "Oceans Are Losing Oxygen—and Becoming More Hostile to Life.")

One of the most worrying phenomena is that entire species populations—such as plankton, jellyfish, turtles, and seabirds—are moving toward the poles by up to 10 degrees latitude, taking up residence in waters previously too cold to support them. That's five times faster than land animals are migrating north.

In particular, fish species moving out of their known range could destabilize the world's fisheries. In Southeast Asia, for instance, as fish leave their homes, marine fisheries may fall by up to 30 percent by 2050, the report says. And in East Africa and parts of the Indian Ocean, where warming has already killed coral reefs, fish species have also died, taking away many fishermen's livelihoods. (See "As Oceans Heat Up, a Race to Save World's Coral Reefs.")

The outlook is particularly bleak for coral reefs, also a mainstay of ecotourism for many countries—some areas have already lost up to half of their reefs, according to the report.

The latest models predict that by 2050, warmer oceans will bleach nearly all the world's reefs. So-called bleaching which occurs when a coral's symbiotic algae—the cause of their vibrant colors—depart en masse, leaving the coral to likely starve. (Related: "93 Percent of the Great Barrier Reef Is Suffering.")

People who live near or interact with the ocean could also be at increased risk of illness, as warmer oceans quickly spreads pathogens, such as cholera-carrying bacteria and algal blooms that can cause neurological diseases.

And as the ocean warms, so will severe weather, such as hurricanes and typhoons, says Andersen, who noted the rare double hurricanes that recently skirted Hawaii.

According to the report, the number of severe hurricanes have risen by up to 30 percent per degree of global warming, as storms feed on warm water. El Niño, the periodic warming of water in the Pacific Ocean, has also intensified over the past two decades.

Jellyfish (pictured, an animal off Queensland, Australia) are predicted to change habitats—for instance, some species may migrate to deeper waters.

PHOTOGRAPH BY DAVID DOUBILET, NATIONAL GEOGRAPHIC CREATIVE

## Moving Forward

So "how are we going to stop going to hell in a handbasket?" asks Greg Stone, executive vice president at the nonprofit organization Conservation International and a marine expert.

He suggests treating the ocean like a sick patient that has a temperature. To lower the temperature, that requires stopping polluting the atmosphere with carbon—of course, no easy task.

Another solution, however, is creating marine protected areas—in essence, "telling the patient to rest. Then the immune system has a chance of fighting," says Stone, who was not directly involved with the new report.

"There's good news on that front," he adds. Just this week, President Obama quadrupled the size of Hawaii's Papahānaumokuākea Marine National Monument. The no-fishing zone is now 582,578 square miles, an area larger than all the national parks combined.

The scientists also offered recommendations, such as planning for the imminent blow to regional economies. For instance, if kelp forests die off —which is already taking place—countries need to know what will happen to their fisheries.

Difficult as all of this may sound, it's on us, says Carl Gustaf Lundin, director of the Global Marine and Polar Programme.

"There's no doubt in all our minds that we're the cause of this," he says.

"We know what the solutions are—and we need to get on with it."

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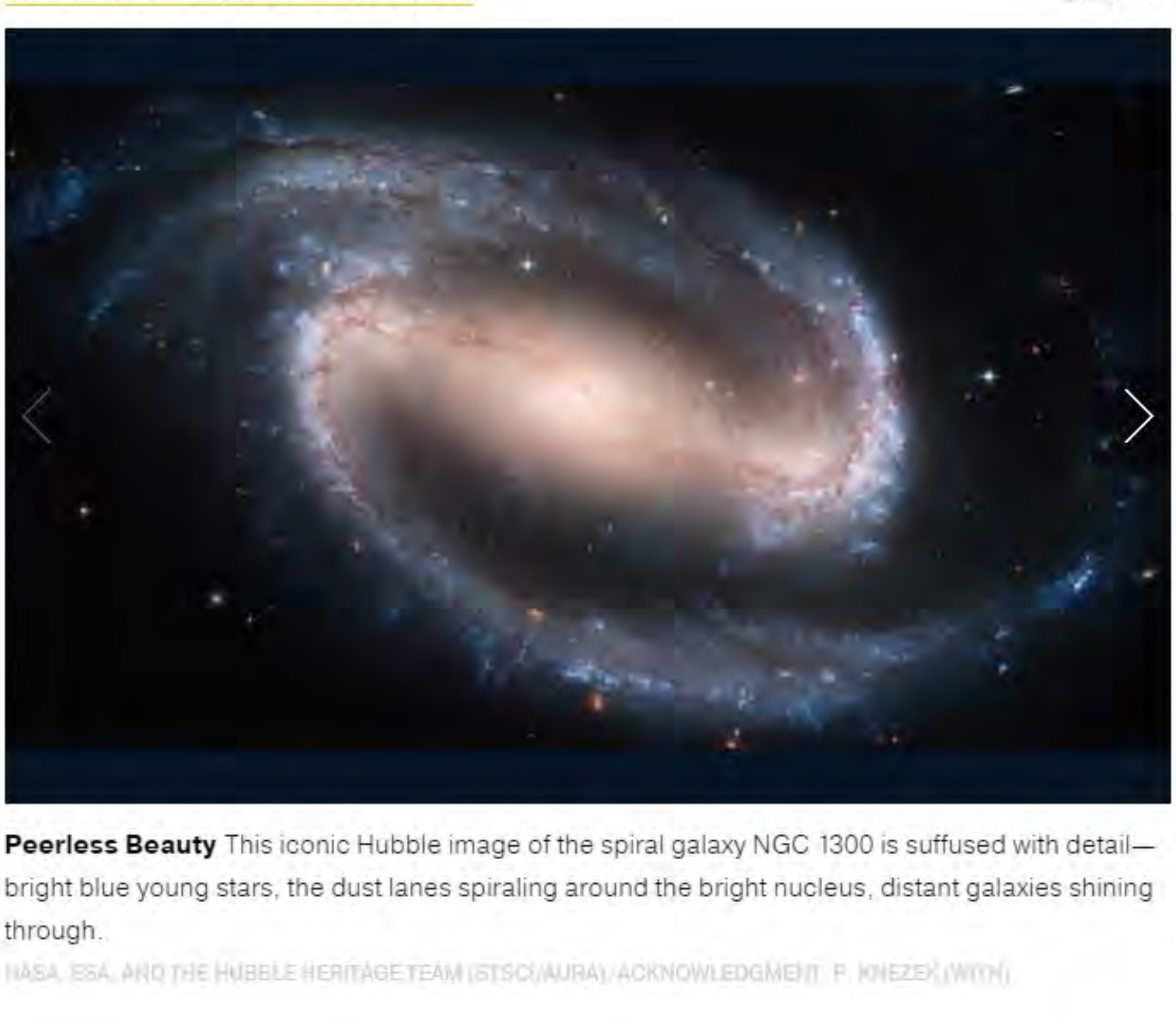

**Peerless Beauty** This iconic Hubble image of the spiral galaxy NGC 1300 is suffused with detail—bright blue young stars, the dust lanes spiraling around the bright nucleus, distant galaxies shining through.

NASA, ESA, AND THE HUBBLE HERITAGE TEAM (STSCI/AURA) ACKNOWLEDGMENT: P. KNEZEK (WIYN)

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