



SOLUTIONS | 04.10.18

A Drop in the Ocean?

As the world’s marine ecosystems face ever-increasing threats, is the trend toward huge, remote reserves a promising new development or a worrisome distraction?

Story by [Erica Gies](#)
Photographs by [Ralph Pace](#)

SHARE   

In an apparent coup for conservation, Brazil recently created two massive marine protected areas (MPAs) totaling more than 900,000 square kilometers (almost 350,000 square miles), upping the country’s protected waters from 1.5 percent to nearly 25 percent. Upon closer inspection, however, it’s clear that these new MPAs will actually allow a variety of activities—including commercial and recreational fishing, mining, and oil and gas exploration—in all but a small portion of the habitats they contain. And some scientists argue that the protections these designations provide are simply misplaced, because, they say, while remote, deep-ocean MPAs help countries meet conservation targets, they may not do enough to protect vulnerable biodiversity.

Brazil’s recent announcement, the latest in a string of similar high-profile ocean conservation initiatives over the past decade, has rekindled an ongoing debate among scientists and conservationists about how best to design marine parks and where to place them. The question is particularly pressing now, because 196 countries (excluding the United States) have committed to conserving 10 percent of their waters—“especially areas of particular importance for biodiversity and ecosystem services”—under the U.N. Strategic Plan for Biodiversity, and the 2020 deadline to meet this target is looming.

According to some estimates, that goal is well within reach. At the United Nations Ocean Conference in June 2017, the executive secretary of the Convention on Biological Diversity said that 5.7 percent of the ocean was already protected, and that participating countries are on track to exceed their targets by the 2020 deadline. But that somewhat rosy picture may be an illusion. In a [paper published earlier this year in *Marine Policy*](#), scientists put the actual protected area at about 3.6 percent, and stipulated that only 2 percent is strongly protected.

“In the rush to achieve their 10 percent targets, many nations are counting as protected areas that might only have been announced as intended for protection in the future,” says Jane Lubchenco, former administrator of the National Oceanic and Atmospheric Administration and coauthor of the paper. Some countries never follow through on such announcements, she says.



A large sea turtle, likely a Galapagos tortoise, is seen resting on a bed of green seagrass and yellow-brown seaweed in clear, shallow water. The turtle's head is turned to the right, showing its eye and nostril. Its shell is dark brown with distinct scutes. The water is a vibrant blue-green, and sunlight filters down from the surface, creating a bright, hazy glow in the upper right corner. The foreground is filled with dense, feathery seaweed and seagrass, providing a natural habitat for the turtle.



Not So Protected

One of the most glaring shortfalls of many marine protected areas is that they still allow a wide range of human activities that have the potential to damage the ecosystems they're intended to conserve.

For example, last year Canada announced its largest MPA, off the southwest coast of Newfoundland. But seven years of negotiations with stakeholders, including those from the oil and gas industry, resulted in an MPA in which 88 percent of the protected area is still open to drilling. In fact, with directional drilling equipment, oil and gas companies can reach under the boundaries of the protected area to access the resources in all but 2 percent of the MPA.

Such direct involvement by industry lobbyists in negotiations about proposed MPAs is not unusual, says Sabine Jessen, national director of the oceans program for the Canadian Parks and Wilderness Society and a veteran of Canada's MPA discussions. "We have all these industry interests lined up against the one or maybe two people from the conservation sector. And yet here we are designing protected areas," Jessen said in an interview for an article published last year in [Hakai Magazine](#).

The process is similarly fraught elsewhere in the world, so it's not surprising that governments might look for an easier way—especially with the 2020 deadline fast approaching. At the end of last year, Canada's protected areas jumped from less than 1 percent of the country's waters to 7.75 percent, when officials enacted fishing closures, a pre-existing management tool under Canada's Fisheries Act, and began calling them "marine refuges."

Classifying such closures as MPAs enables countries to squeeze through a technical loophole: The U.N. agreement calls for participants to protect their waters with MPAs or "other effective conservation measures," and so far, there's no clear definition of what that means.

"Without effective management, MPAs are just lines on maps."

—Megan Barnes, University of Queensland



Many countries are doing this, says Lubchenco. It's one of the reasons why she and her coauthors reached a lower estimate of the total area protected by MPAs. "This is akin to calling a tree plantation a protected park. It may serve an important purpose—production of timber or pulp—but it is not designed to protect natural habitats or biodiversity."

Dozens of studies have shown that only in areas where all extractive activities are prohibited or where only minimal recreational or artisanal fishing is allowed are conservation objectives actually achieved, Lubchenco says. Her team's research found that "fully protected areas can increase total fish biomass by over 600 percent, organism size by over 25 percent, and species richness by over 20 percent relative to unprotected areas nearby." Whereas MPAs that allow even moderate levels of fishing "typically do not even double fish biomass compared to unprotected areas, and leave many vulnerable species at continued risk."



Capacity to manage these areas once they’re declared is also lacking. Just 30 percent of MPAs have the resources they need, according to a [comment published in *Nature Ecology & Evolution*](#) last month, coauthored by Megan Barnes, a conservation biologist at the University of Queensland. Without effective management, Barnes says, “MPAs are just lines on maps.”





Defining Success

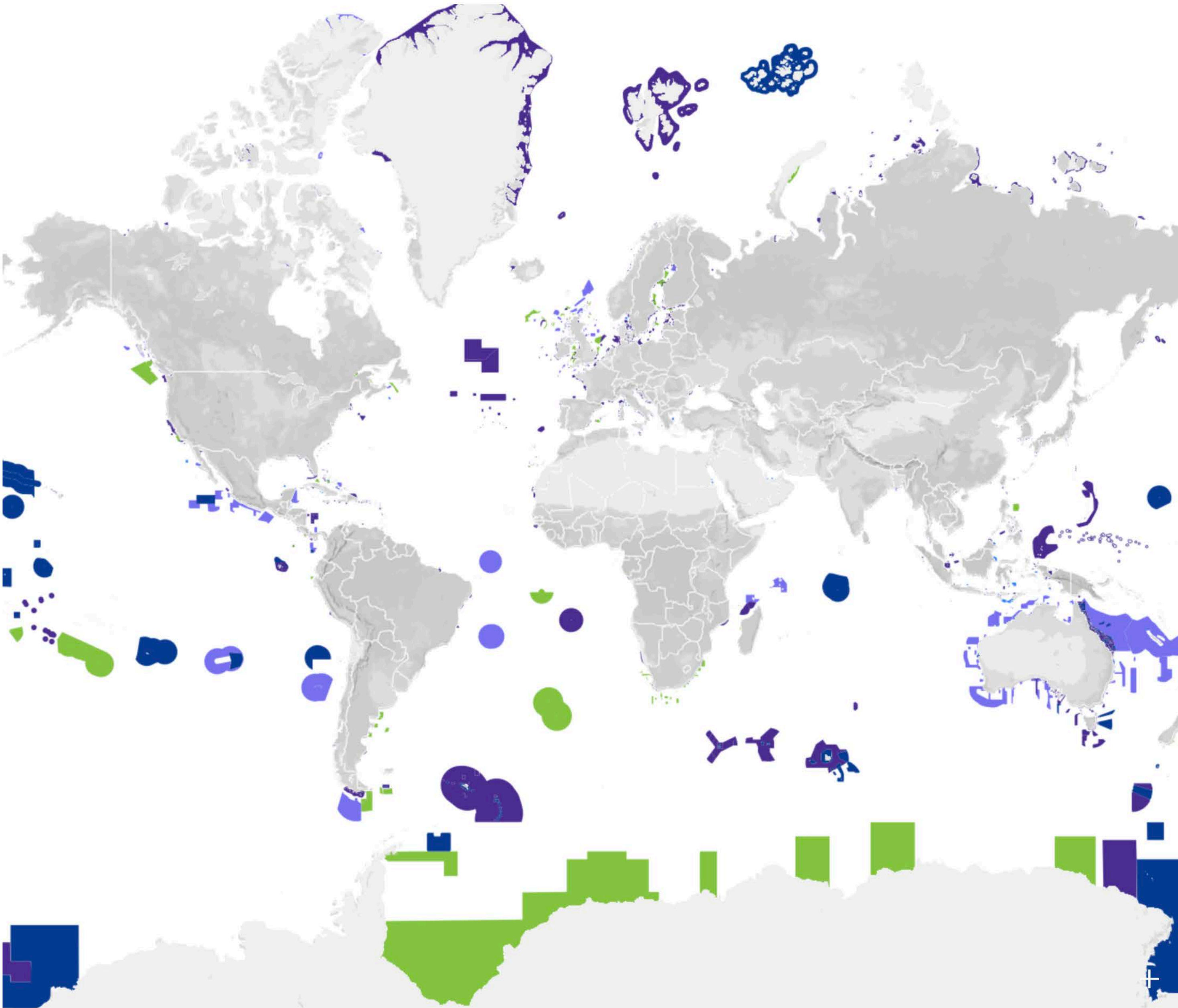
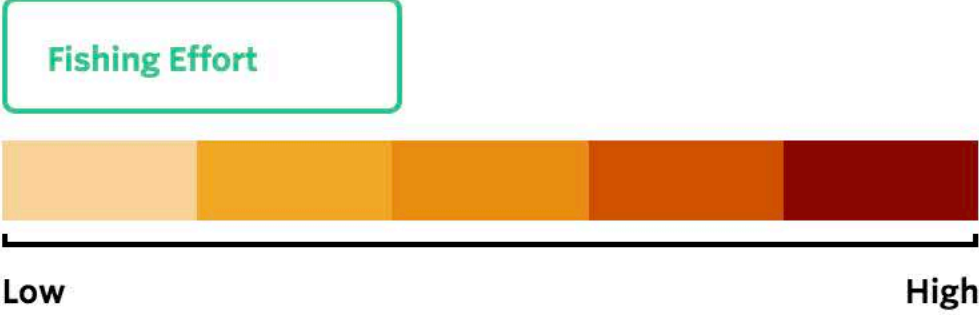
Many researchers are concerned that, while targets can muster political will, the focus on the size of protected areas is sacrificing quality. Luiz Rocha, a coral reef fish biologist at the California Academy of Sciences, argued in an [op-ed for *The New York Times*](#) against what he describes as a trend toward larger, more remote MPAs, including the recent designations by his native Brazil. Very large protected areas, he says, “are being used to reach international targets... but are not really protecting much of anything.”

Rocha is not the only expert who thinks that remote ocean MPAs are missing their intended mark. The recent *Nature Ecology & Evolution* comment by Barnes and colleagues pointed out that the U.N. targets require more than simply setting aside protected areas; they must also be “equitably and effectively managed,” “ecologically representative,” and “well connected” to each other to halt biodiversity loss.

A Global Mismatch?

Marine protected areas currently cover an estimated 3.6 percent of the world's oceans, and many more are proposed. But some experts see a mismatch between where MPAs are placed and where they're needed most—including some of the areas most heavily targeted by industrial fishing fleets (seen here in estimates of fishing effort during 2017).
Data provided by [MPAtlas](#) and authors of "[Tracking the Global Footprint of Fisheries](#)" (Science, February 2018)

- Strongly Protected Reserve
- MPA with No-Take Zones
- Other MPA
- Designated (pending implementation)
- Proposed MPA





By those measures, existing MPAs are collectively failing. According to the paper’s authors, “more than half of marine eco-regions have under 5 percent of their area protected. Over 85 percent of threatened vertebrates are unrepresented,” and the need to maintain connectivity among various habitats “is rarely assessed.”


Part of the reason for these shortcomings is that MPAs in different parts of the world are often created with different objectives in mind. “Is it just a fishery management tool, or is it protecting biodiversity in general, or is it perhaps a culturally important habitat?” asks Will White, a fisheries biologist at Oregon State University, posing the types of questions that guide MPA proposals.





Even within conservation circles, objectives can vary dramatically. For example, a [paper in *Nature Scientific Reports*](#) last month mapped hotspots around the world according to such measures as species diversity, evolutionary importance, diversity in ecosystem function, and value of the area's renewable and non-renewable resources, such as fishing, tourism, and oil extraction. The researchers, led by Martin Lindegren, found a massive challenge for scientists and ocean managers planning MPAs, namely that these hotspots are located in different places. To make matters worse, none of the indices of biodiversity and natural resource potential correlate with existing MPAs. "Neither the world's most diverse, nor the most productive ecosystems are currently the most protected," the authors concluded.

Deciding which areas to conserve is further complicated by climate change, which has already begun to shift ocean currents, raise temperatures, and increase acidification. Ecosystems and species may change in unpredictable ways in response, which means areas conserved today may fail to protect them tomorrow.



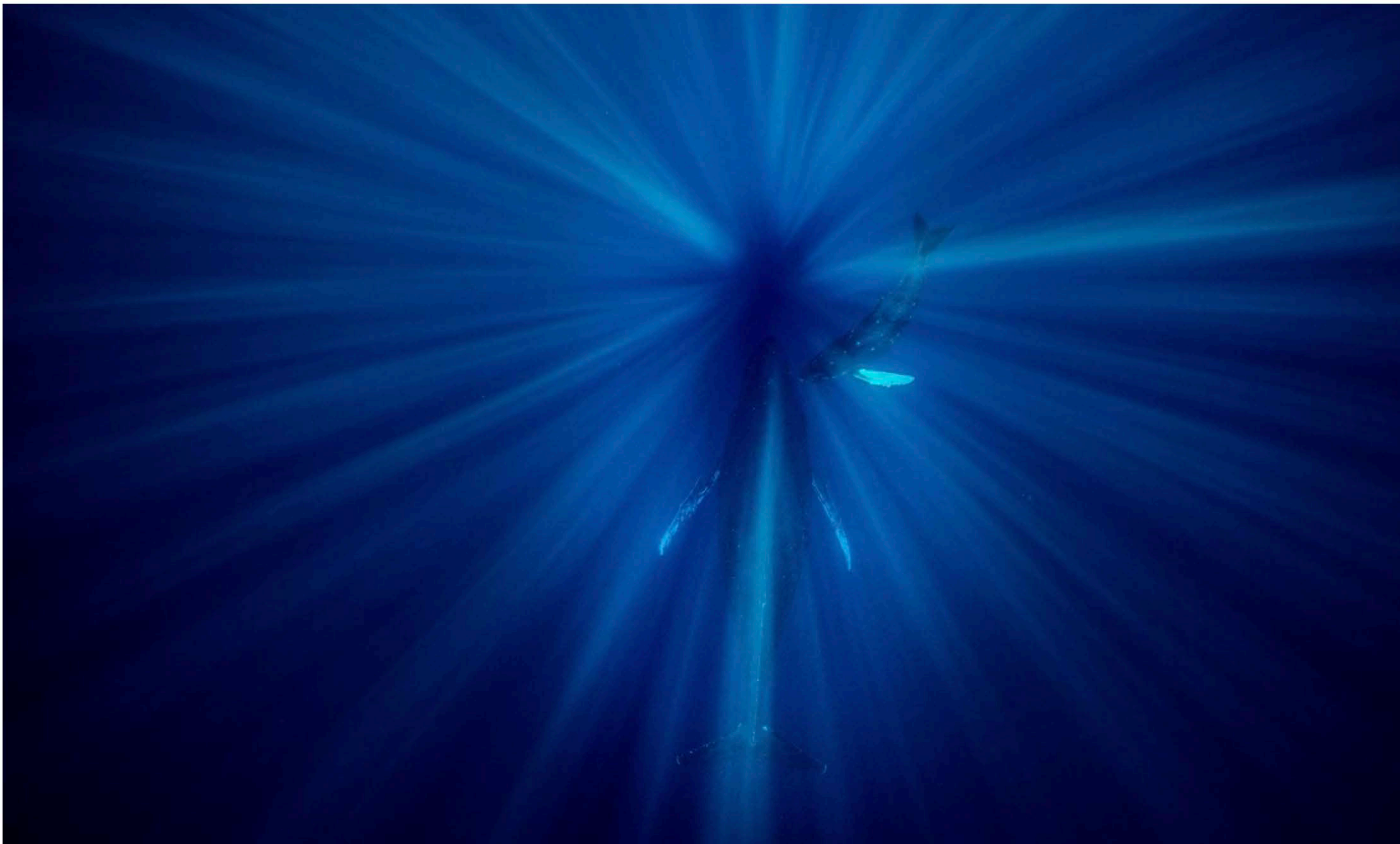
"In which planet does it make any sense to create reserves in places where nobody goes fishing?"

—Luiz Rocha, California Academy of Sciences

Tough Choices

Rocha and others argue that countries are opting for large, remote marine reserves because it’s cheaper and easier to establish them where relatively few people are invested in resource extraction. For example, according to Rocha, many areas considered prime candidates for new reserves also happen to be where industrial fishing pressure is lightest—either because of pre-existing closures or because targeted fish species spend little time there. “In which planet does it make any sense to create reserves in places where nobody goes fishing?” he asks, adding that patrolling these areas consumes resources that would be better spent protecting diverse coastal habitats and other areas where fish aggregate to spawn and feed.

Barnes agrees that there is limited money, attention, and political will for ocean conservation and favors prioritizing near-shore areas. Coral reefs, she says, offer the opportunity to “make the biggest difference” because they contain at-risk species and populations, fish breeding habitat, and because they’re under the greatest threat from human activities.





MPAs are not meant only to rebuild stocks of overharvested species, says White. “Usually there is also interest in protecting habitats in general, including non-exploited species. Many coral reef species are not typically fished, for example.”

And that list of habitats should include remote, deep-ocean ecosystems as well, says Brad Sewell, an attorney for the Natural Resources Defense Council, because they support species found nowhere else in the world—species that might otherwise go unprotected by fisheries managers, including many that are particularly vulnerable to disturbance because they’re relatively long-lived.

Hawaii’s Papahānaumokuākea Marine National Monument, one of the world’s largest MPAs, includes some of these deep-ocean habitats. The reserve “contains offshore seamounts and ridges that are home to ancient deep sea corals that are ecologically important, just like their tropical coral cousins, and literally thousands of exotic deep sea species,” Sewell says. Marine mammals, sea birds, sea turtles, sharks, and many other fish species also forage, spawn, and raise their young there.

The idea that the distant ocean doesn’t need our protection is outdated, says Lubchenco. “Most of the ocean used to be a de facto MPA simply because it was too remote or too deep for people to access easily. Today, we fish, mine, drill, and extract pretty much everywhere. As a result, the natural safe havens for wildlife have disappeared.”

The paper she coauthored concluded, “The ocean needs all types of MPAs, from large to small, from remote to adjacent to inhabited areas.”

“Today, we fish, mine, drill, and extract pretty much everywhere. As a result, the natural safe havens for wildlife have disappeared.”

—Jane Lubchenco, Oregon State University



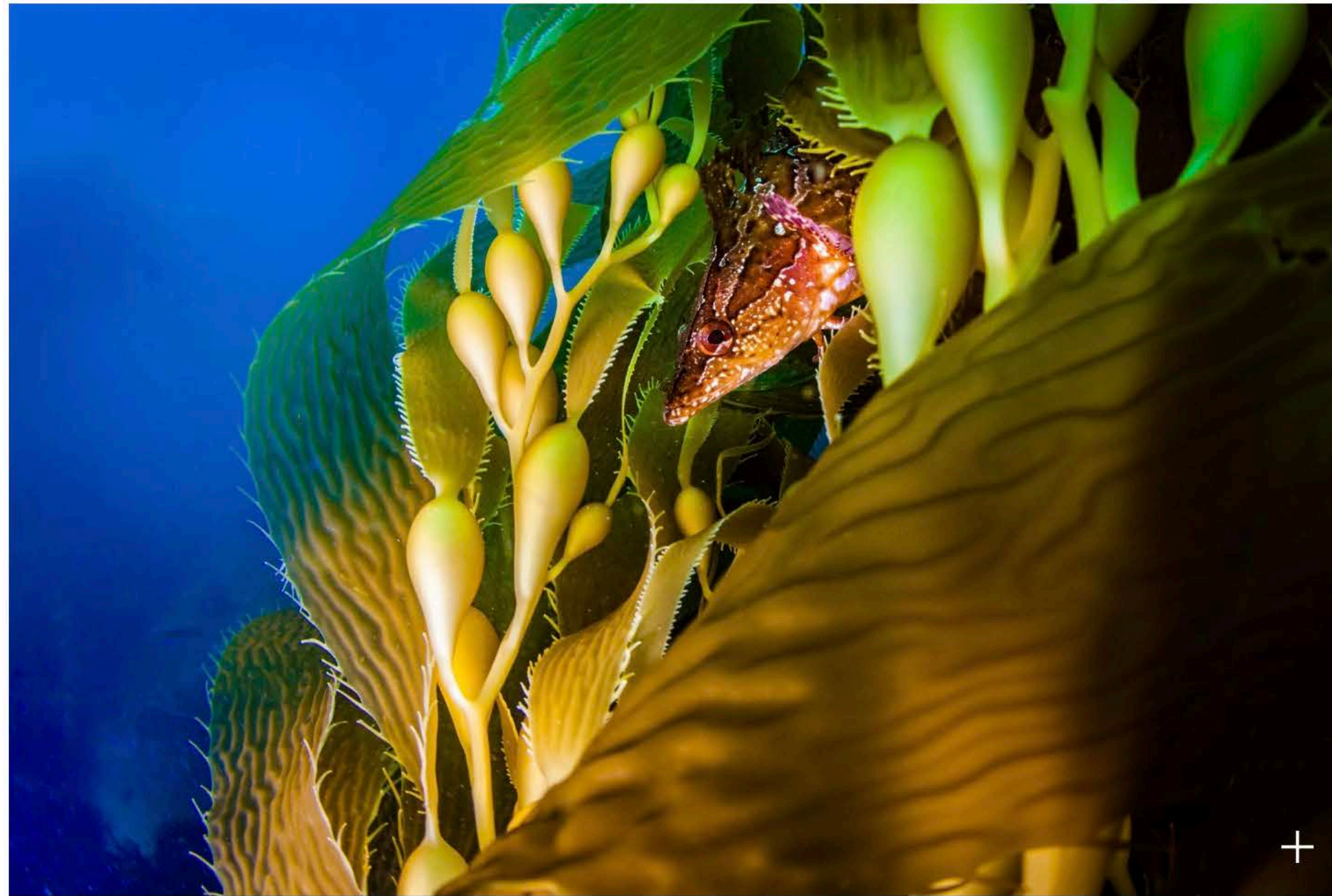
But some scientists, faced with the hard fact of limited resources and political will, say we must prioritize, and fear that the U.N. target is distorting those choices by focusing on size. Very large MPAs, Rocha says, can deliver “a false sense of protection” and “remove the public pressure for conservation.”



A Public Process

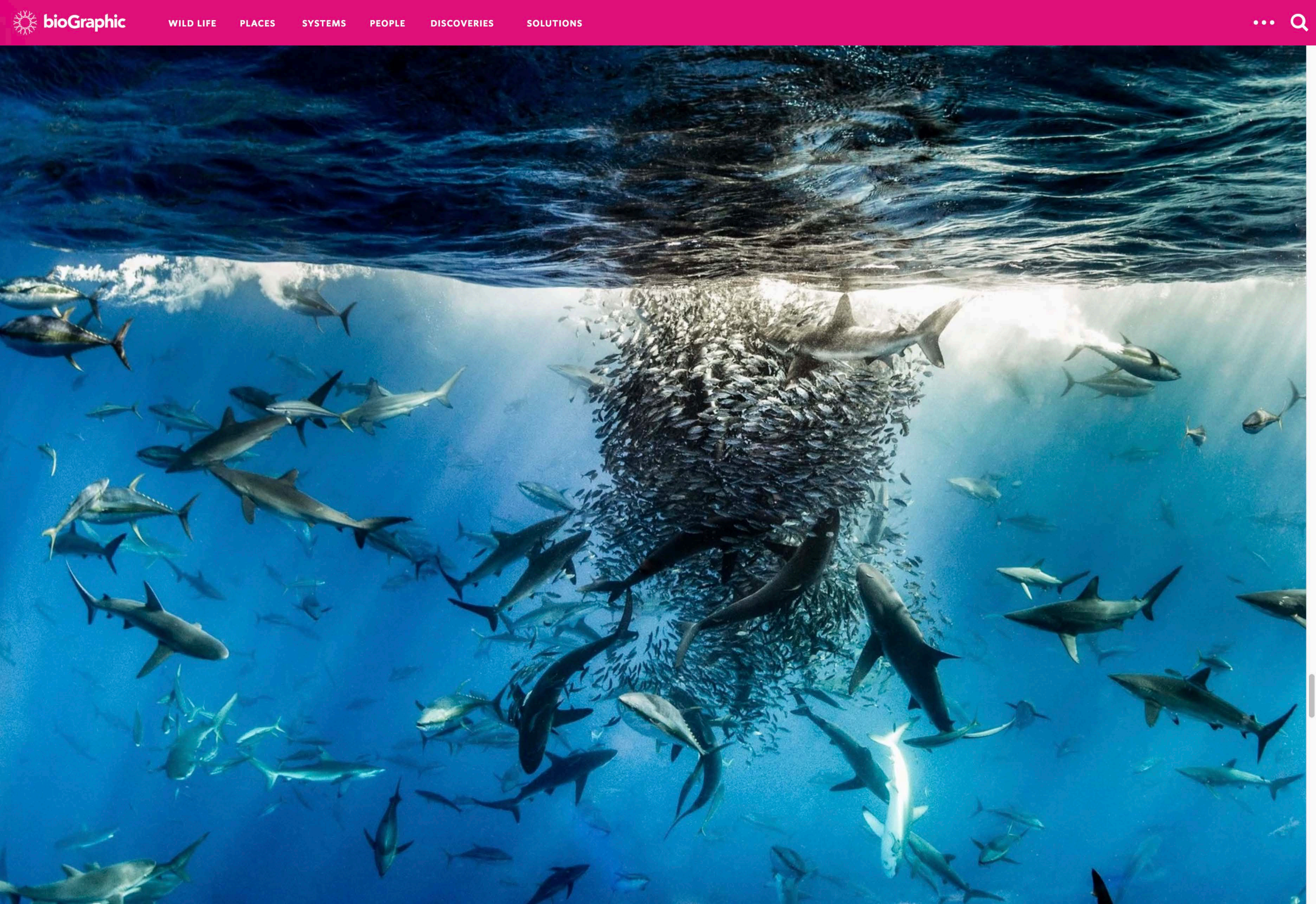
Scientists' concern that research is frequently sidelined by political and economic factors is undoubtedly valid. But sometimes communities and governments can lead conservation, motivated by concern about a biologically unique habitat or a culturally important area, and look to scientists to inform their work. The Apo Island reserve in the Philippines is a good example of this, says White, as was Papahānaumokuākea.





“What typically doesn’t work is for scientists to propose MPA designs without engaging in a political and economic process,” he says. That’s what happened in California in the early 2000s. “When that plan was presented to local residents, it was noisily rejected,” says White, a member of the scientific advisory team. When they tried again later, the scientists provided guidance, but the stakeholders proposed the MPA boundaries. “This meant that the stakeholders engaged with the science and had ownership over the protection of their local habitats.”

California’s necklace of 124 MPAs stretching from Mexico to Oregon, more than 13 years in the making, is now viewed by many scientists as a best practice, and those who worked on it now advise MPA planning in Oregon, British Columbia, and elsewhere, says White. The network design, protecting roughly 16 percent of state waters, allows species in distress to move into other protected areas, which may enable them to be more resilient in the face of climate change.



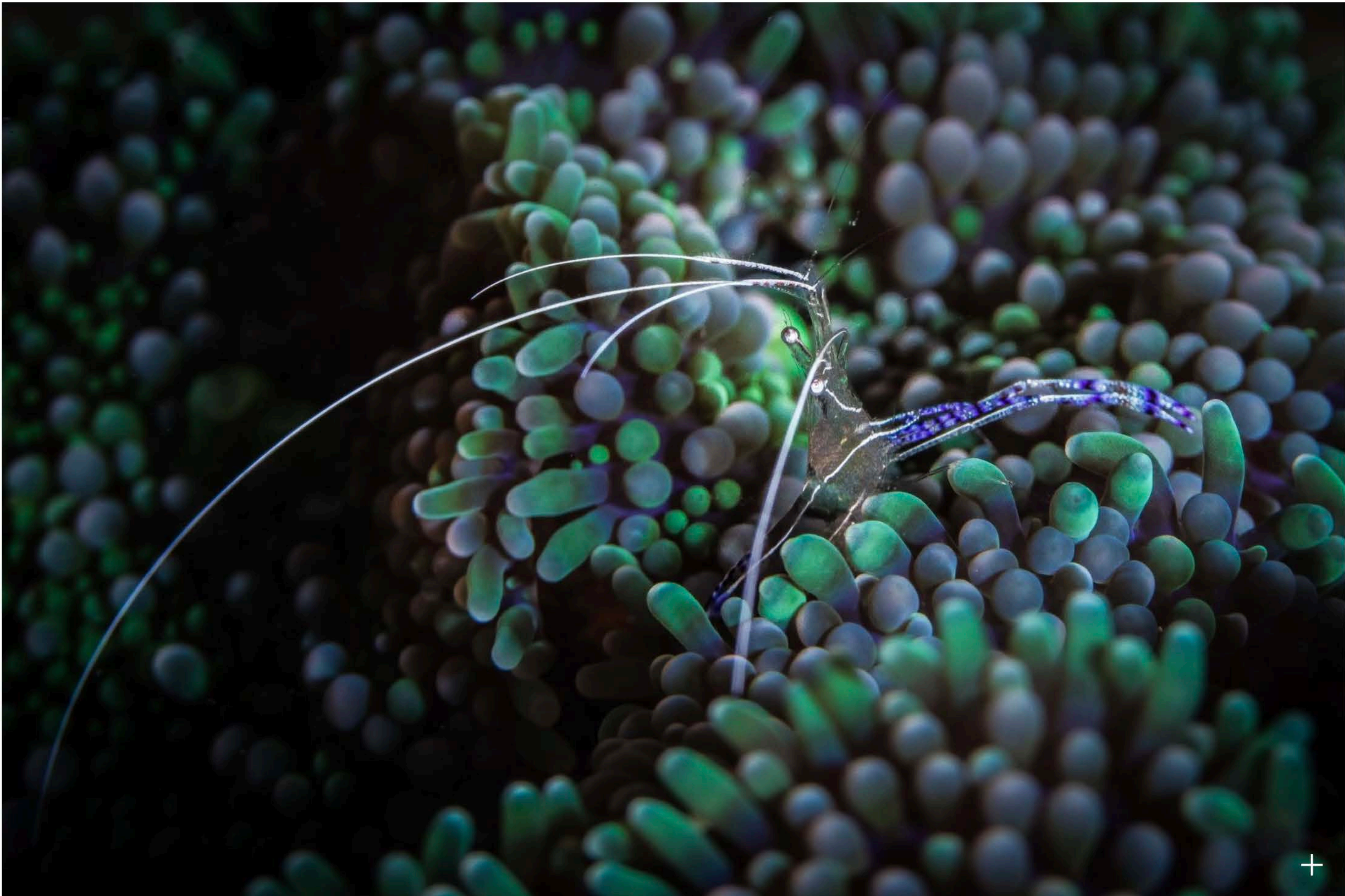




Making Room for Resilience

Whether we manage to set aside 2 percent of our oceans, or 10 percent, or even 16 percent, scientists and policymakers are fiddling around the edges of decline. And because the science is complex and there aren't simple answers, and because the need is vast and the money and political will are slim, conservationists are fighting over scraps. They are recommending compromises that embed loss into the calculation.

If we really want to maintain biodiversity and ensure a healthy future for our oceans that sustain human life—with food, CO2 absorption, climate regulation, and much more—according to the International Union for Conservation of Nature, we need to protect 30 percent of our oceans with no extractive activities by 2030. Some scientists have suggested that an even higher percentage is necessary for long-term sustainability.





And even the strongest MPAs cannot protect against climate change, oil spills, plastic pollution, agricultural runoff, illegal fishing—all factors aggravated by the twin fundamental drivers of biodiversity loss: the exponentially increasing number of humans on the planet and their consumption of resources, according to a recent [paper in *Nature Ecology and Evolution*](#). But protected areas can provide space for resilience.

To make the best possible decisions that will give the greatest number of species a shot, marine scientists are calling for more investment in monitoring and a reporting framework linked to conservation goals so that the limited resources the world is willing to set aside for other species will buy maximum value. MPAs need to be placed “where they can make the most difference,” says Barnes.





Map interactive by James Davidson

Love what we do? You can help.

We’re a free multimedia magazine without a paywall or intrusive ads—and we’d like to keep it that way. We believe these stories need to be told; that inspiring both a deep appreciation for life on Earth and hope for its future is a critical step toward a thriving planet. If you agree, please consider making a donation to help secure the future of *bioGraphic*. Every little bit helps.

Donate

SHARE



ABOUT THE AUTHOR

Erica Gies covers water, energy, critters, and more on the science and environment beat. She holds a master’s degree in literature, with a focus in eco-criticism. Her work has appeared in *The New York Times*, *Scientific American*, *Nature*, *The Economist*, and others.



ABOUT THE PHOTOGRAPHER

Ralph Pace is a freelance natural history and conservation photographer who lives in San Diego, California. Pace combines his background in science and his passion for photography as he seeks to act as an interpreter of the natural world, to simplify scientific messages through imagery, and to further conservation efforts.