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Supporting a Healthy Ocean

The far-reaching benefits of large, fully protected areas

Overview

The ocean covers nearly three-quarters of the planet and plays an essential role in supporting life on Earth. Its waters help regulate global chemistry and climate, and are home to over 2 million species, many of which still await discovery.¹ This rich biodiversity enhances the fisheries that provide food for more than 4 billion people.²

As the human impact on the ocean intensifies, critical ecosystem benefits are being lost. Currents carry millions of tons of plastics and other debris from the shore into open waters, where the waste harms marine life and changes the way healthy ecosystems function.³ Fishing also takes a toll. Worldwide, 4 million open-sea vessels catch more than 80 million metric tons of fish every year,⁴ which has led to the global decline of marine fisheries. Today, 90 percent of stocks are fully exploited or overexploited.⁵ New fishing technologies, such as massive steel deep-sea bottom trawls and sonar- and GPS-equipped fish aggregating devices, also degrade important ocean habitats and increase the amount of unintended catch, known as bycatch. The effects of rising atmospheric carbon dioxide, such as rising ocean temperatures and increasingly acidic waters, further compound the stress on marine ecosystems.

Large, fully protected marine reserves are a key tool for addressing many challenges to ocean health. These reserves protect ocean areas from human activities, such as large-scale fishing, extraction of natural resources, and other destructive uses. And that helps conserve species, habitats, and ecosystem processes. To date, however, about 2 percent of the world's ocean has been designated as fully protected marine reserves. Leading scientists strongly recommend that at least 30 percent be fully protected.⁶



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Top: Rock Islands of Palau.

Middle: Butterfly fish photographed off Easter Island.

Bottom: Easter Island underwater.

Marine reserves bring strong protections

A 2014 study found that human activity has a cumulative impact on ocean ecosystems and that marine reserves yield the greatest conservation benefits when they are large, highly protected, isolated, well-enforced, and long-standing. The benefits increase dramatically when all five features are in place. For example, marine protected areas with all of these characteristics have 14 times as much shark biomass (the total amount of marine life), twice as many large fish, and five times as much fish biomass as unprotected areas. In comparison, marine protected areas with only one or two of these characteristics were largely indistinguishable from fished areas.⁷

Large, fully protected marine reserves help protect ocean life. They are by no means the sole solution for all that plagues marine systems, but they do benefit ecosystems by:

- **Safeguarding biodiversity.** A review of scientific studies of over 120 marine reserves around the world found that reserves result in average increases of 21 percent in the diversity of life and 28 percent in the size of fish and other marine organisms. They also have, on average, 450 percent more biomass than unprotected areas.⁸ Reserves can be particularly important to areas that are home to threatened, endangered, or unique marine creatures.
- **Providing ecological benefits to neighboring ecosystems.** The benefits to marine life extend beyond reserve borders. Because of the spillover effect, thriving populations of fish within closed areas are more likely to move into nearby waters.⁹ In addition, the process known as “seeding” disperses larvae from species within a reserve to outside areas.¹⁰
- **Protecting predators and maintaining ecosystem stability.** Marine reserves bring significant benefits for predators. For example, at one site in the Philippines, predatory fish biomass continued to increase exponentially 18 years after the establishment of the reserve.¹¹ Recent science also highlights the critical role that healthy populations of large marine predators play in stabilizing ecosystems¹² and how rebuilding their numbers can lead to healthy and more complex food webs.¹³ These ecosystems are then better able to cope with and recover from unexpected environmental changes.

Marine reserves also benefit communities by:

- **Supporting the local economy.** By ensuring a vibrant, healthy ocean, marine reserves can attract tourism and, in turn, bolster local economies. Attracting visitors is critical to many island nations and territories. For example, in Palau, ecotourism plays a central role in current and expected economic growth. More than half of the nation’s visitors are divers engaged in an activity that generates about \$90 million each year for the economy.¹⁴

- **Creating more resilient coasts by strengthening reefs.** A 2013 study found that no-take marine reserves that prohibit fishing for parrotfish may make coral reefs six times more resilient to coral bleaching. When these restrictions are accompanied by management actions on climate change, the loss of reefs could be reduced by one-third.¹⁵ In 2014, scientists found that healthy coral reefs reduce risk from natural hazards such as storms, flooding, and erosion. They provide significant protection and decrease wave energy by an average of 97 percent. Nearly 200 million people living near coasts worldwide could benefit from the risk reduction provided by reefs.¹⁶
- **Honoring cultural heritage.** For many cultures—such as those in Easter Island, French Polynesia, and Palau—conservation is a cornerstone of the community’s history and daily life. Protecting the land and sea honors long-held practices and beliefs. For example, chiefs in Palau have acted for centuries to protect local waters through the traditional *bul*, a moratorium on catching key species or fishing on reefs that provide critical habitat. Residents of French Polynesia’s Austral Islands understand the importance of their island culture and have launched efforts in recent decades to restore long-abandoned practices that link their heritage and their environment.
- **Enhancing monitoring and enforcement.** Enforcement experts say that the ability to conduct monitoring and surveillance activities is enhanced by prohibiting all extractive and destructive activities within a defined area. When an area is declared off limits to fishing, the rules are clear and monitoring becomes easier: instead of needing to identify which species a particular vessel is targeting or which types of gear are being used, enforcement can focus on any vessels detected in a non-fishing zone. This can be done using satellite and other tracking technologies, such as Project Eyes on the Seas and the Virtual Watch Room for marine reserves. Pew has partnered with Satellite Applications Catapult to create this cutting-edge technology that merges satellite tracking and imagery data with other sources of information, such as fishing vessel databases and oceanographic data, to help monitor seas across the globe.

Conclusion

Negative impacts touch every part of the ocean, but the harm can be reversed. Large, fully protected marine reserves can help conserve biodiversity and valuable habitats, factors critical to maintaining ecosystem function and buffering against environmental change. These reserves can also bring far-reaching and long-term economic growth to local economies and safeguard the unique and important traditions of cultures around the world that are historically tied to the seas.



Left: Lobster photographed off Rapa, Austral Islands, in French Polynesia.



Right: Sea turtle in the waters around Palau.

Endnotes

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