The Case for Marine Protected Areas

A proven way to safeguard biodiversity, bolster fisheries, protect ocean habitat, and support coastal communities

Overview

Ocean health is critical to life on this planet. Phytoplankton, the microscopic plants found in the sunlit areas of the ocean, produce about half of Earth's oxygen, and the exchange of heat, water, and energy between marine waters and the atmosphere helps to regulate the climate worldwide.[1]

Yet ocean health has been in decline for decades because of a growing number of threats, including overfishing, biodiversity loss, pollution, and ocean acidification. Science shows that protecting more of this vital resource is essential to reversing the damage.[2]

In recent years, the global community has increasingly recognized the importance of ocean protection in helping marine life and habitats to recover and flourish and benefiting communities that depend on healthy fisheries. In 2022, following more than four years of negotiation, 196 member countries of the Convention on Biological Diversity agreed to the Global Biodiversity Framework, which included the goal of protecting at least 30% of the ocean by 2030 ("30 by 30") through marine protected areas (MPAs) and other area-based conservation measures.[3] However, conservation leaders stress that meaningfully achieving this target depends on the quality, not just the quantity, of protection. For MPAs and other conservation areas to be successful, they must be effectively managed, monitored, and enforced.

MPAs are the principal tool for large-scale ocean conservation, but they are part of a broader strategy. The success of MPAs is linked to the health of the wider ocean, and it is therefore crucial to responsibly manage unprotected areas as well. Here are five critical benefits of a well-designed and -managed MPA.

Protect biodiversity

An MPA is a designated area managed for the long-term conservation of nature.[4]

By restricting fishing and other damaging activities, well-designed and -managed MPAs allow depleted marine life populations to recover and protect key species and vulnerable habitats. For instance, strategically, protecting spawning or nursery areas of vulnerable species is a highly effective method to replenish fish stocks and support resilient fisheries.[5]

A recent study examining the 100 largest MPAs shows that even minimally protected areas that allow damaging activities still provide some conservation benefit, though these benefits are limited and unlikely to prevent the continued decline of species and habitats.[6] And of course, when damaging activities intensify, conservation benefits—including improved ecosystem function and resilience—diminish.

MPAs that are fully or highly protected (allowing either no extractive or destructive activity or limited small-scale fishing) yield the greatest benefits to biodiversity over time.[7] A large body of research shows how large, well-managed protected areas increase average fish size and abundance and enhance biodiversity if those areas have strong legal protections, local leadership, long-term financing, and effective enforcement.[8]

A silky shark patrols the waters of Revillagigedo National Park, Mexico's largest fully protected marine reserve. Studies show that fully protected areas convey more benefits to species and habitat than do less-protected areas. *François Baelen/Ocean Image Bank*

Enhance fisheries

Fish populations that thrive within protected areas rarely stay within those boundaries. Studies have demonstrated that this spillover effect can sustain or increase catches in nearby fisheries,[9] lead to increased fish biomass, and aid in the recovery of predatory species.[10] Notably, a 2017 comprehensive research review found that the biomass of fish in no-take MPAs is, on average, 670% greater than in adjacent unprotected areas and 343% greater compared with partially protected MPAs.[11]

MPAs can also be designed both to help marine life to thrive and to support fishing. For example, the British overseas territory of Tristan da Cunha designated approximately 90% of its waters as a no-take marine protection zone. The government also set aside areas where the community's economically vital and Marine Stewardship Council-certified lobster fishery can continue to operate sustainably. This approach allows for large-scale marine conservation while securing a fishery that accounts for 80% of the local economy.[12]

Tristan da Cunha's marine conservation measures restrict fishing across about 90% of its waters, but it also includes zones where spiny lobster—the island's principal source of income—can be sustainably caught. *Katie Davis/Birdlife*

Similarly, in creating the Pitcairn Islands MPA, one of the world's largest, that government designated 99.5% of its waters as a no-take zone. This extensive protection safeguards unique marine biodiversity, including more than 1,200 species of mammals, seabirds, and fish. The MPA, in the Pacific Ocean roughly midway between Chile and New Zealand, also includes small zones around the inhabited island where residents can engage in limited artisanal fishing from small open boats using hand lines and rocks as weights. This ensures that the local community can maintain its traditional fishing practices and secure food without harming the broader marine environment.

Chile also created a large-scale MPA—Rapa Nui Multiple Use Marine Coastal Protected Area—to limit threats from industrial fishing, mining, and other extractive activities throughout the waters surrounding the remote Pacific island. The 740,000-square-kilometer (286,000-square-mile) protected area also allows artisanal fishing practices. These waters harbor at least 142 species found nowhere else and serve as important spawning grounds for many migratory species, such as tuna, marlins, and swordfish.

Safeguard connectivity

A thriving ocean depends on what scientists call "ecological connectivity"—or a bustling highway system for marine life. The intricate network allows for the uninterrupted flow of wildlife, plants, nutrients, and even energy throughout the vast ocean environment. Ocean health hinges on these complex connections.[13]

A variety of wildlife, including whales, sharks, and turtles, migrate thousands of miles across open ocean to feed, breed, spawn, and mature. Studies of leatherback turtles, northern elephant seals, salmon sharks, and white sharks have found that these species repeatedly return to specific areas.[14] Further, a recent global study that tracked over 100 highly migratory megafauna species, including sharks, seals, whales, and turtles, found that about 75% of these animals passed through active fishing areas during their travels.[15]

Effectively protecting areas where highly migratory animals gather, breed, or spawn can help ensure that these species thrive far into the future.[16] Such protections would complement existing measures, such as those that safeguard key foraging habitats for migratory birds and nesting beaches for marine turtles.[17] MPAs are most effective at supporting biodiversity when they interconnect or encompass multiple ecosystems, such as seagrass beds and open ocean, because these connected corridors often extend across national borders.[18]

This is one reason Colombia, Costa Rica, Ecuador, and Panama in 2004 agreed to establish the Eastern Tropical Pacific Marine Corridor (CMAR), a regional conservation partnership to protect migratory species, coordinate efforts to monitor and enforce fishing regulations, and promote the sustainable use of marine and coastal resources. This partnership then yielded a joint commitment in 2021 to create a 500,000-square-kilometer (193,000-square-mile) transboundary marine reserve comprising the underwater corridors that connect the countries' collective protected areas, such as Ecuador's Galápagos Islands and Costa Rica's Cocos Island. The entire region boasts key habitats for whales, tuna, rays, sea turtles, and birds, as well as the world's highest concentrations of sharks.[19]

Secure economic benefits for people

MPAs that meet the criteria above and are developed through fair, socially inclusive processes are most likely to generate long-term economic benefits.[20] These direct and indirect benefits can include tourism, fisheries, ecosystem services, and broader economic development.

MPAs can significantly boost tourism by preserving healthy, biodiverse marine ecosystems and attracting visitors for activities such as diving, snorkeling, and whale watching.

Examples abound: In the Galápagos Marine Reserve, marine-based tourism contributes over $200 million annually to the local economy. Shark diving in the Bahamas generates more than $100 million annually. And in Australia's Great Barrier Reef Marine Park, tourism revenue exceeds $4 billion annually.[21]

Beyond direct economic activities like tourism and fisheries, MPAs play a crucial role in maintaining or enhancing a wide range of ecosystem services—the benefits that humans derive from the natural environment. Coastal protections are among the most significant ecosystem services that MPAs provide. For example, coral reefs, mangroves, seagrass beds, and wetlands act as natural breakwaters, absorbing wave energy, reducing coastal erosion, and mitigating flooding caused by storm surges and rising sea levels.

A study estimated that protecting shallow-water coral reefs alone can save countries around the world $4.3 billion in annual flood protection benefits.[22] In the United States, the U.S. Geological Survey has estimated that coral reefs provide $1.8 billion in annual flood protection services.[23] Studies also reveal that mangrove forests provide an estimated $855 billion in annual global flood protection benefits and that the ecosystem services of Caribbean seagrasses are worth more than $250 billion annually.[24]

Economic outcomes vary significantly across different MPAs and depend on many factors, including location, management quality, community involvement, and local economic conditions.

Bolster climate resilience

Mounting scientific evidence shows that highly and fully protected MPAs encompassing nearshore environments offer substantial benefits for climate resilience along with coastal protection and mitigation, which involves long-term removal and storage of carbon.[25]

Further, by safeguarding crucial spawning grounds and nurseries, coastal protected areas can boost the number and size of marine life as well as the number of young that are born and successfully join the population.[26] This, in turn, enhances genetic diversity, making species populations more resilient to environmental change and bolstering localized food security. Intact ecosystems, including coral and oyster reefs, seagrasses, wetlands and mangroves, also protect coastal communities against extreme weather events, sea-level rise, and erosion.[27] It is therefore vital to safeguard these habitats from threats such as overharvesting, dredging, and coastal development.

The United Nations Framework Convention on Climate Change (UNFCCC) recognizes the climate mitigation potential of mangroves, salt marshes, and seagrasses because of their capacity to sequester carbon and protect shorelines and communities. In fact, to help meet emission reduction targets, a growing number of governments are including those habitats in their nationally determined contributions (NDCs) to the Paris Agreement—which is acceptable under the agreement if the governments can verify these ecosystems' carbon sequestration and successfully monitor and manage these areas.[28]

Evidence also indicates that well-protected MPAs can build ecosystem resilience in open ocean environments, which can lead to more and bigger fish and invertebrates and increase the number of young being produced. Large MPAs that encompass multiple habitats, or networks of MPAs that safeguard migratory pathways and key habitats, further ensure that both mature marine life and larvae can move without facing threats from humans.[29] This flow makes the entire ocean ecosystem more resilient to change, including times when species are shifting their ranges.

An orca rises above the rich and icy waters of Antarctica's Ross Sea, home to the world's largest fully protected MPA.
Jaime Ramos/United States Antarctic Program

Conclusion

As governments strive to meet 30 by 30 protection while responsibly managing the rest of the ocean, the science is clear: Large-scale, highly protected and effectively managed MPAs deliver substantial benefits to nature and people. These areas effectively boost ocean biodiversity, enhance fisheries, and strengthen the economies that depend on them.

Recognizing that lasting conservation requires equitable governance, Pew Bertarelli Ocean Legacy collaborates with governments, Indigenous and local communities, scientists, and other partners to create, expand, and effectively manage MPAs worldwide, addressing serious threats to our oceans. In the face of a wide range of threats, large-scale, effective MPAs offer a vital tool for achieving a healthy ocean.

Endnotes

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Pew Bertarelli Ocean Legacy is a partnership between The Pew Charitable Trusts and Dona Bertarelli. Building on more than a decade of effort, they have worked with communities, governments, Indigenous groups, scientists, and other partners to establish the first generation of marine protected areas, conserving more than 16 million square kilometers (6 million square miles), of which nearly 12 million square kilometers (5 million square miles) are highly and fully protected areas.