The Case for Marine Protected Areas

A way to safeguard biodiversity, bolster fisheries, and protect ocean habitat

Overview

Ocean health is critical to all life on this planet. Phytoplankton, the microscopic plants found in the sunlit area of almost all oceans, generate about half of the Earth's oxygen, and the complex interaction between the ocean and the atmosphere sustains our climate.[1] Yet the oceans are in decline, largely because of human activities that are driving the collapse of fisheries, the loss of biodiversity, and the acidification of seawater. The evidence suggests that to halt this downward slide, more of the world's ocean must be protected.[2]

In 2016, members of the International Union for Conservation of Nature, a global authority on the status of the natural world, adopted a motion recommending that nations protect 30 percent of their waters from all extractive activities by 2030. Safeguarding ocean space in marine protected areas (MPAs) has been proved to help conserve marine life and associated habitats. Creation of MPAs can improve ocean health and provide multiple benefits to the people whose lives and traditions are linked to these waters.

Protecting biodiversity

An MPA is a defined geographical area of water that is managed to achieve the long-term conservation of nature.[3] In these areas, fishing and other human activity is restricted, which allows depleted populations to recover while protecting key species and vulnerable habitats. MPAs that share these five characteristics have been shown to have the greatest impact: fully protected with no extractive activities permitted, well-enforced, older than 10 years, larger than 100 square kilometers (38 square miles), and in isolated locations.[4]

Over time, fully protected areas result in more and bigger fish and greater biodiversity.[5] These benefits accrue in different climates and have been observed in tropical and temperate regions.[6]

Enhancing fisheries

Fisheries benefit from the creation of MPAs. Thriving populations of fish within fully or strongly protected areas are more likely to supply adult and larval fish to outside areas. The spillover of animal life from the MPA then sustains or increases the catch of nearby fisheries.[7] One study in Ecuador's Galapagos Islands found that waters surrounding an MPA supported higher catches and greater fishing effort.[8] Effectively placed MPAs have been shown to increase fish biomass and offer a path to recovery for predatory species such as tunas and sharks.[9] Protecting key spawning or nursery areas used by vulnerable species can also be highly effective.[10]

Creation of MPAs as a fisheries management tool is garnering support and interest, specifically because of its contributions to ecosystem-based management approaches. Data from the U.N. Food and Agriculture Organization shows a tripling of the percentage of stocks fished at unsustainable levels from 1974 to 2015.[11] New evidence indicates that fisheries regulations on their own may be insufficient in creating sustainability, and a combination of management steps and fully protected areas may be necessary.[12]

Connectivity

The sustainability of marine life can depend on how well populations and critical ocean ecosystems are connected. As individuals within a species move to other areas and reproduce, they maintain what is known as population connectivity. MPAs that are contiguous or incorporate different ecosystems—for example, an area that protects essential fish habitat such as sea grass as well as open ocean—can maintain the interaction among marine communities. Large MPAs that encompass multiple habitats, or networks of MPAs that protect migratory pathways and key habitats, can better ensure the connectivity of populations, which can then help build resilience in a changing environment.[13]

Benefits to highly migratory species

A lack of good data about the movement of highly migratory species can make it more difficult to determine the role and benefit of MPAs in safeguarding highly mobile animals, some of the ocean's key predators. Although complete habitat range is still being documented for many of these species, research suggests that their movement can be predictable. For example, tagging studies of leatherback turtles, northern elephant seals, salmon sharks, and white sharks have found that these species repeatedly return to specific areas.[14]

Protecting areas used by these animals for spawning or as nurseries could prove highly effective.[15] Species can exhibit increased vulnerability when they form groups to spawn, feed, or migrate.[16] Protecting these habitats for migratory fishes through MPAs can reduce threats linked to specific areas in the same way that small protected areas are used to protect key foraging habitats for migratory birds or nesting beaches for marine turtles.[17]

Economic benefits

Protected areas can lead to economic growth through tourism. For example, the Hanauma Bay Nature Preserve, a fully protected area on the Hawaiian island of Oahu, has about 3,000 visitors a day, making it one of the most visited beaches in the state.[18] The educational awareness created by the visitor center at the bay is expected to generate about $100 million in value added to the community over the next 50 years.[19]

Protecting habitats such as coral reefs can generate considerable benefits for communities. For example, the net benefit from coral reefs to Hawaii's economy has been estimated at $360 million a year, and that can lead to scientific investments.[20] Since 2005, over $10 million has been invested in research in the Papahānaumokuākea Marine National Monument, another protected area in Hawaii.[21]

Climate change

Mounting scientific research indicates that fully protected marine areas can help build resilience against the effects of climate change.[22] The alterations are far-reaching and include rising sea surface temperatures, the loss of coral reefs as waters acidify, decreased ocean productivity, shifts in species distribution, and impacts on fisheries.[23]

MPAs help build biodiversity and genetic diversity, improve carbon sequestration, and even enhance the absorption of carbon dioxide. Safeguarding mangroves and coral reefs in coastal areas can provide buffers against storms while protected wetlands aid in long-term storage and carbon sequestration.[24] MPAs can lead to more resilient ecosystems and in turn help secure the well-being of societies that depend on healthy oceans.

Conclusion

MPAs can play a significant role in addressing the threats facing the ocean. These areas can help boost ocean biodiversity, fisheries, and the economies that depend on them. The Pew Bertarelli Ocean Legacy Project is working with governments, local communities, indigenous groups, and other partners to support creation of MPAs around the world to aid in restoring ocean health for the benefit of all.

Endnotes

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The Pew Bertarelli Ocean Legacy Project | The Pew Charitable Trusts and the Bertarelli Foundation joined forces in 2017 to create the Pew Bertarelli Ocean Legacy Project, with the shared goal of establishing the first generation of ecologically significant and effective marine protected areas around the world. This effort builds on a decade of work by both organizations to protect the ocean. Between them, they have helped to obtain designations to safeguard over 8 million square kilometers (3 million square miles) of ocean by working with philanthropic partners, indigenous groups, community leaders, government officials, and scientists. Since 2010, the Bertarelli Foundation has sought to protect the ocean for future generations through marine conservation and collaborative marine science research.