

***Marine Protected Areas
for Protecting Biological Diversity,
Ecosystem Integrity, and Sustainable Fisheries***

Testimony of Environmental Defense
Concerning
Marine Protected Areas

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By

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Introduction

Marine Protected Areas are useful and flexible tools for solving multiple problems and achieving multiple goals, the two most prominent being the protection of the rich diversity of ocean life and the improvement of fisheries management. I will focus my remarks on fully protected marine reserves, a special type of MPA in which all extractive and polluting activities are prohibited, because most of the available scientific studies on MPAs focus on fully protected reserves.

The ocean is home to an amazing assortment of life and habitats, which many people value in and of themselves. We have very limited knowledge of the extent of this diversity, but each new study or expedition seems to reveal many more species. In the ocean, one can still discover fish thought to be extinct, mysterious squids, and a new species of octopus that appears to mimic fish. The ocean also bestows many benefits on society, providing food, minerals, and ecosystem services. However, as vast as the ocean is, human activities are taking a toll. The scope of our activities has expanded greatly from the coastlines to offshore seamounts. Interest in mining hydrothermal vents 2,000 meters deep is increasing. Marine reserves are needed to provide refuges for nature to manifest itself fully, to maintain the many goods and services that the ocean provides, and to leave a natural legacy to future generations.

Marine Reserves can Help Protect Marine Biodiversity

Marine reserves demonstrably help protect marine biodiversity and marine ecosystem integrity. A recent survey of 89 scientific papers on marine reserves in both tropical and temperate regions revealed that: (1) 90% of the reserves studied had higher fish biomass than fished areas; (2) fish population density was higher in 63% of the reserves; (3) 83% of the reserves had larger fish and invertebrates; and (4) 59% of the reserves had higher species diversity. This survey showed that the average size of fish and shellfish within reserves are between 20 and 30% higher relative to fished areas; densities are roughly double in reserves; and biomass levels are nearly triple in reserves. The fact that most marine reserves have more species, more individuals of particular populations, and individuals of larger average size than fished areas of similar habitat shows that fishing is having an impact on the structure of marine ecosystems, and that marine reserves can help these ecosystems recover from these impacts. New studies show that some species targeted by sportfishing are also much more abundant in marine reserves than in fished areas, suggesting that sportfishing can deplete some species just as commercial fishing can.

It's important to remember that marine reserves protect all species within their borders, not just overfished populations. Reserves can help accelerate the rebuilding of depleted populations, but they also protect healthy populations of exploited species, as well as the tens of thousands of unfished species in the ocean.

Recommendations

- Create a legislative mandate for existing federal agencies or for a new Oceans Department to protect marine biodiversity and ecosystem health with a national network of marine reserves, while allowing uses that are compatible with this overarching goal

Reducing fragmentation of agency jurisdictions will not be sufficient; a new mandate is needed. The Nation's network of marine reserves currently covers less than 1% of the EEZ, and needs to be expanded to include representatives of each major habitat type, in each biogeographical province of the EEZ.

- Define distinct biogeographical provinces and inventory the nation's marine biodiversity to support the development of a national network of marine reserves

All levels of biodiversity must be protected to keep options open for the future and to honor the intrinsic value of ocean life. Biogeographical provinces provide a geographical framework for capturing the diversity of habitats and ecosystems in the Nation's waters, for defining large marine ecosystem boundaries, and for organizing stakeholder groups to discuss, plan, and help implement marine reserves.

- Create marine reserve planning and research processes at workable scales, and integrate them at larger scales (e.g., community-based planning and management integrated with regional planning and management) using decision-support tools

Forging consensus and creating workable plans are often easier accomplished at smaller scales, with smaller numbers of people. Small-scale or regional efforts can be integrated by agencies assisted by integration panels charged with looking for and filling gaps in planning and research.

- Create a legislative mandate for more funding for MPA management and research

Funding for living marine resource management and research has not kept up with management needs.

- Reject any policies, such as the Freedom to Fish Act, that pre-empt the ability of the federal government or states to establish marine reserves

The states and the federal government should retain the flexibility to experiment with and implement new ocean management tools as understanding of the sea and our effects on it improves. The burden of proof should be upon those who seek to benefit from extracting resources or from using the ocean's assimilative capacity to show that their activities are not likely to compromise ecosystem integrity or result in unacceptable impacts to biological diversity.

Integrating Marine Reserves with Fisheries Management

The major problems with current fisheries management in the United States include: (1) excessive fishing capacity, fostered by perverse economic incentives; (2) lack of sufficient scientific understanding of fish populations and ecosystems; (3) inadequate attention to maintaining healthy ecosystems that sustain fisheries; (4) failure to provide a stable regulatory environment; (5) lack of adequate measures to deal with and reduce scientific uncertainty.

Marine reserves can help address many, but not all of the problems faced by fisheries management. In overcapitalized fisheries, capacity must be reduced to levels more consistent with the biological productivity of fished populations and with profitability. Open access management should be replaced with management regimes that create incentives for stewardship. These reforms will produce major benefits in their own right, as well as facilitate the implementation of marine reserves.

We must recognize that improvement of fisheries management is not the same as enhancement of fishery yields. There is strong evidence that reserves can improve management, but there have not yet been many studies on the effects of reserves on yields.

Marine reserves can help achieve the primary, but elusive, goal of fisheries management: the protection of sufficient spawning biomass to sustain fisheries. The protection of adult fish in a reserve is more cost-effective than protecting the same number of adult fish through conventional harvest-control rules for at least two reasons: (1) we can have greater assurance that a given number of fish are actually protected in the reserve than by harvest-control rules alone, because harvest-control rules suffer from major uncertainties

in stock assessment and estimated fishing mortality, which can vary dramatically with weather and market conditions; (2) each fish in the reserve is likely to create many times more eggs than fish outside the reserve, because they are generally larger and older, and fecundity generally increases greatly with the age and size of fish.

For example, one female Pacific ocean perch (*Sebastes alutus*) that is 23 cm long generates 10,000 eggs, while one that is about twice as long (45 cm) generates 300,000 eggs (or 30 times more). The biomass set aside in a reserve can be treated as an insurance policy against management and scientific errors, such as the overestimates of rockfish productivity that resulted in the near-collapse of the west coast groundfish fishery. In that case, the biomass in the reserve would not be included in total biomass estimates when allowable catch levels are calculated. As experience with marine reserves increases, it will be possible to account for the biomass and increased reproductive capacity of fish in the reserves more explicitly, resulting in increased allowable catch levels. Models suggest that marine reserves may also help stabilize catches, and hence, reduce the number of regulatory changes that cause hardship to fishermen.

Another way that reserves can improve fisheries management is to change the basis of management from single species to an ecosystem focus. The fish and shellfish that we like to eat are no less a part of our nation's wildlife heritage than are dolphins and sea otters. They live in ecological communities and interact extensively. However, fisheries management in the United States and most other countries considers fish to be like monoculture crops that can be managed individually. It is based on the idea that sustainable yield can be maximized by fishing down populations to levels that maximize productivity. This strategy can work for highly productive populations that have limited interactions with other species. However, such populations are rare indeed. Most species interact strongly with other species in many different ways, for example, by eating them, by being eaten, by competing with them, and by creating or destroying habitat. We now know that fishing can cause fundamental changes in the dynamics of marine populations, as well as in how marine ecosystems function. Recognition of these realities has led to the development of a new approach to fisheries management and conservation based on the idea that sustainable fishery yields depend on the maintenance of intact ecosystems and the ecological processes that create and sustain these ecosystems.

Marine reserves can be particularly helpful in fisheries where fishing mortality is poorly known, for example, sport fisheries. Recent information indicates that certain game species are many times more abundant in marine reserves than in fished areas, showing that sportfishing can deplete certain populations and that marine reserves can help protect these populations.

Marine reserves are fundamentally different from closed areas or seasonal restrictions in that they are intended to generate "interest" from the "principal" protected within the reserves. Closed areas are intended to allow fish populations to rebuild to levels at which they can be fished again. Seasonal restrictions may not allow fish populations to recover more natural age distributions, including larger, older fish, as marine reserves do.

Marine reserves can also alleviate one of the most pressing problems in the Nation's fisheries, that of bycatch. Marine reserves protect all species within their borders, including less productive species that are caught incidentally outside the reserves. Bycatch mortality of these species often results in severe constraints on fisheries, such as closed areas or restricted seasons. If marine reserves are located in areas where bycatch rates are high, bycatch can be directly reduced. In addition, marine reserves can accelerate rebuilding programs for both targeted and bycatch species that may then reduce the constraints on fisheries.

Marine reserves can help fill the ecosystem gap in fisheries management by protecting representative habitat types from fishing and other extractive activities. We also need better implementation of comprehensive habitat protection measures, such as the Essential Fish Habitat provisions of the Sustainable Fisheries Act, effective bycatch reduction measures, and performance standards for gear.

Few studies of the effects of marine reserves on catches are available. Of the 10 field studies we reviewed, catch per unit effort increased significantly near marine reserves in 8 of them. Compliance with reserve regulations was relatively poor in one marine reserve that did not enhance catches; another had degraded habitat. These studies by and large only measure the effects of adult fish migrating out of reserve boundaries into nearby fishing grounds. Modeling studies project a far larger benefit of marine reserves to fisheries based on the export of larvae that will grow into catchable adults on the fishing grounds.

Marine reserves also provide one of the only ways to evaluate the effects of fishing on fish populations and marine ecosystems. Just as scientists attempt to control variables in the laboratory to isolate the effects of one factor, marine reserves offer scientists "control" areas with which to study the "experiment" of removing large numbers of individuals from marine ecosystems, or of disturbing the bottom with various types of fishing gear.

Recommendations

- Amend the Magnuson-Stevens Fishery Conservation and Management Act to emphasize the need to protect marine biodiversity and ecosystem health with marine reserves (perhaps these amendments can be modeled on California's Marine Life Management Act and Marine Life Protection Act)

The MSFCMA is currently focused on the production of optimal yield.

- Amend the Magnuson-Stevens Fishery Conservation and Management Act to reconfigure the regional fishery management councils as ecosystem management councils to carry out this mandate

The regional council system has many benefits, including the potential for using local knowledge and the tailoring of fishery management to the biology of local fish populations, markets, and other needs. However, the councils are trying to carry out the

optimum yield mandate of the MSFCMA based on single-species management. The councils should be charged with maintaining healthy ecosystems that in turn can sustain fisheries.

- Embed fisheries management within a Department and Agency with a mandate that reflects the understanding that natural ecosystems and biodiversity must be maintained in order to sustain fisheries

The Department of Commerce and its National Marine Fisheries Service currently have authority over the Nation's fisheries. If the basis for fisheries management is to shift from a single-species orientation to an ecosystem orientation, the vision, mandate, and institutional structure of the agency with authority over fisheries management should all be aligned with an ecosystem orientation.

- Amend the Magnuson-Stevens Fishery Conservation and Management Act to focus on bringing fishing capacity into balance with the productivity of target populations and ecosystems in flexible ways that respond to natural variation and create incentives for conservation and stewardship

The current mixture of open access and limited access policies creates incentives to overfish, and allows fishing capacity to ratchet upward with little or no ability to adapt to changes in fish productivity. Individual Fishing Quotas or similar market-based policies create incentives to conserve fish for the future, reduce fishing capacity, and provide a mechanism whereby a fishery can adjust to higher or lower fish populations through the buying, selling, or leasing of individual quotas. IFQs are currently banned under a moratorium imposed by Congress. This moratorium should be lifted, and national guidelines for IFQ program design should be promulgated. The reduction of fishing capacity would result in economic and conservation benefits directly, while facilitating the implementation of marine reserves and other conservation measures.