

# **New Approaches on Energy and the Environment**



# **New Approaches on Energy and the Environment: Policy Advice for the President**

*Edited by*  
**Richard D. Morgenstern  
and  
Paul R. Portney**

**Resources for the Future**

Washington, DC

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# CHAPTER 21

## Zoning the Oceans

### Changing the Focus of U.S. Fisheries Management

*by James N. Sanchirico*

**O**ur nation has one of the most productive and diverse marine environments in the world, but many of these resources are threatened. Mr. President, this does not have to be the case. Two commissions recently released reports detailing the causes, tools, and organizational restructuring needed to reverse this trend, both of which discuss the potential role for zoning the oceans. Sir, I recommend that you issue an executive order directing the secretaries of commerce and interior to launch a major new cross-agency initiative to zone our oceans by 2010, along with providing the necessary funding. Zoning the oceans would delineate portions of our marine environment for particular uses, just as on land. This is a bold idea that—unlike current approaches to management—can ensure economic growth and biological sustainability.

### Background

The United States has about 95,000 miles of coastline and more than 3.4 million square miles of ocean within our exclusive economic zone. Within these waters exists a marine biodiversity rivaling that of some of the most treasured land-based systems. With habitats ranging from coral reefs and sea grass beds to salt marshes and mangrove forests, the ocean and coastal areas surrounding the United States and its territories are teeming with marine life.

These habitats and the resources they support provide the public with a valuable and diverse set of goods and services, including seafood, recreational enjoyment, carbon sequestration, storm protection, and opportunities for pharmaceutical discoveries. The National Marine Fisheries Service (NMFS) estimates that commercial fisheries alone add approximately \$27 billion per year to U.S. gross domestic product. In addition, about 3.5 million acres of coastal wetlands provide many vital services and resources, including nursery, feeding, breeding, and resting areas for fish,

shrimp, crabs, mollusks, and birds. The coastal environment also supports many tourism and recreation activities.

The ocean is critical to society's economic and social well-being, but scientific studies confirm that many of our marine resources are overexploited and face external environmental threats. NMFS reports that 76 of the 894 federally managed fish stocks are overfished and another 60 are subject to overfishing. Too many boats chasing too few fish bring our ocean resources to the brink of collapse and sometimes beyond, as happened in the New England cod fishery in the early 1990s and more recently in the West Coast rockfish fishery.

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## Managing Living Marine Resources

Four concurrent paradigmatic shifts are under way in how societies approach managing marine resources. The first two, marine biodiversity conservation and the ecosystem approach, address the goals of management; the others, marine reserves and rights-based fishing, are policies that can reverse current trends and also address the expanded sets of goals. The underpinnings of these changes are discussed in the June 2003 Pew Oceans Commission report and the April 2004 U.S. Commission on Ocean Policy draft report.

### **Marine Biodiversity Conservation**

A marine biodiversity conservation ethic is blossoming that will challenge the current management framework, which was designed for maximizing the returns from extractive uses. The constituent base for marine resources must get larger and more knowledgeable and vocal, however, before biodiversity conservation will be considered a legitimate goal in the political economy of marine policy. As it stands, according to a survey by the Ocean Project, the American Public possesses "only superficial knowledge of the oceans, their functions, and their connection to human well-being."

That the public is not fully aware of the oceans' importance is not surprising, as much remains that marine scientists do not yet understand. For example, the U.S. National Oceanic and Atmospheric Administration estimates that more than 95 percent of the world's oceans remains unexplored, and some estimate that about 5,000 marine fish species have yet to be discovered. Partially to address our knowledge gaps, the Census of Marine Life (CoML) project was launched in 2000. The project, funded by both public and private sources, includes some 300 scientists from 53 countries. Its goals are to describe marine biodiversity, to understand its role in the functioning of ocean ecosystems, and to standardize scientific sampling and data management protocols by 2010.

Although the American public does not currently list marine biodiversity as an issue of immediate concern, putting areas aside to conserve it would have real benefits. Many would argue that during the first years of the twentieth century Americans were not fully aware of the values and importance of terrestrial biodiversity for

ecosystem functions. Yet President Theodore Roosevelt set aside places for perpetuity that today have become symbols of our nation.

Could coral reefs and seamounts become symbols of our national natural treasures over this coming century? Yes. It is also my belief that the world will witness in the coming years a movement to set aside areas of the ocean that will rival the U.S. land conservation movement of the early twentieth century.

### ***Ecosystem Management***

Fishery management has traditionally been designed one species at a time. Many implicate the single-species approach, scientific uncertainty, and tendencies to favor higher catch totals for sociopolitical purposes in our current crisis.

While many definitions exist on what constitutes ecosystem management, almost all are based on the idea that fishery management decisions should not adversely affect ecosystem function and productivity. This would entail setting policies to reduce habitat damage by mobile bottom gear, such as bottom trawling. It also would take into account the incidental catches of marine mammals by swordfish long-liners in the Pacific or sea turtles by shrimp fishers in the Gulf of Mexico. Additionally, fishery managers would need to take into account predator-prey relationships when setting catch levels to ensure that catches of one species do not affect the sustainability of the other species.

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Recent proposed legislation in the 107th and 108th Congress emphasizes the need to design ecosystem-based management plans. But from an operational standpoint, many of the hard questions remain, such as what a “true” ecosystem management plan entails. In addition, it is not clear what ecological and economic trade-offs are inherent in an ecosystem plan. What is clear, however, is that an ecosystem approach is compatible with an integrated and well-planned zonal approach, as the instruments and uses in zones can incorporate their effects into ecosystem function.

### ***Marine Reserves***

Marine scientists are moving away from the assumptions that marine populations are evenly distributed toward notions of patchy habitats with population abundances varying across space. Because management historically has been characterized by systems of relative uniformity of regulatory actions over space, this shift enables fine-tuning that will lead to more biological and socioeconomic sustainable management.

Partly as a result of this new “patchy paradigm,” in 2001 more than 150 marine scientists signed a scientific consensus statement outlining the current need for and benefits from the creation of marine reserves—areas of the ocean set aside from all extractive uses. The list of potential benefits includes conservation of biodiversity, sources of larvae, greater levels of biomass, increased catches, and a hedge against management failures.

Historically, very little of U.S. waters have been protected. However, largely at your discretion, Mr. President, that could change, as the Clinton administration issued two executive orders that put support behind the need for and use of marine protected areas, especially marine reserves. The first order created the Coral Reef Task Force, which recommends designating special areas, including “no-take zones, to protect and replenish coral reef ecosystems and prevent future harmful impacts.” The second, and arguably more far-reaching, effort came in 2000, when federal agencies were instructed to develop a national system of marine protected areas (MPAs). The Marine Protected Areas Federal Advisory Committee, a multi-stakeholder group, was formed to advise the secretaries of commerce and interior on the implementation of a national system of MPAs.

### ***Rights-Based Approaches***

In order to address the problem of “too many boats chasing too few fish,” and the economic and ecological waste of this phenomenon, managers need to implement rights-based approaches, such as individual fishing quotas (IFQs). Such quotas currently are used in many different fisheries and countries, including the United States, to regulate fishing efforts to the benefit of both fishermen and the environment. Another rights-based approach is a fishing cooperative in which fishermen are granted legal authority to collude to determine who will fish and for how much. Such a system was set up in the Alaskan pollock fishery in 1998 and is generally viewed as a success.

IFQ programs are analogous to other cap-and-trade programs, such as the sulfur dioxide allowance-trading program. They limit fishing operations by setting a total allowable catch, which is then allocated among fishing participants, typically based on historical catch. When fishermen have access to a guaranteed share of the catch, they have an incentive to stop competing to catch as much as possible and start improving the quality of their catch. When shares are transferable, inefficient vessels find it more profitable to sell their quotas than to fish them. The result will be fewer and more efficient vessels.

Rights-based approaches are critical instruments that need to be included within a zonal management system for several reasons. First, in existing programs, governments charge the quota owners fees that recover the costs of management, such as data collection, scientific research, onboard observer programs, and other enforcement programs; this is very appealing, especially in this time of budget deficits. Second, IFQ programs offer a market-based solution to the overcapacity problem (addressing “too many boats”) that does not rely on direct payments from the government in the form of vessel buyback programs. Finally, and most important, research at Resources for the Future has shown that the total value of New Zealand’s IFQ fisheries, which account for more than 85 percent of the commercial catch taken in its waters, has more than doubled in real terms from 1990 to 2000, even as fish stocks are improving.

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## The Zonal Approach

Employing a zonal approach is beginning to be discussed in national and regional meetings on how to improve U.S. ocean governance. In general, the approach requires looking at the system not as one biological, legal, and economic homogeneous unit, but as an interconnected system of heterogeneous spatial units—much as we do with management of terrestrial natural resources.

All of these fundamental paradigm shifts can be incorporated within a zonal approach, but this cannot be done by tweaking current approaches. With a zonal system in place, a no-take zone designed, for example, to protect a unique habitat or rare and special ecosystem assemblage could be abutted against a commercial fishery harvest zone employing individual fishing quotas.

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***If marine reserves are not coupled with approaches that address incentives, then any economic gains and most likely the biological gains will be dissipated as fishermen continue to race for the fish—the very circumstances that created momentum for increasing the scale and scope of marine reserves.***

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If marine reserves are not coupled with other approaches that address the incentives fishers face, then any economic gains and most likely the biological gains from a reserve will be dissipated as fishermen continue to race for the fish—the very circumstances that have created momentum for increasing the scale and scope of marine reserves. On the other hand, a zonal approach can ensure both the efficient utilization and sustainability of the ecosystem beyond the boundaries of the current proposed no-take zones, thereby improving the long-run health of the entire marine ecosystem.

In addition to accommodating marine reserves and IFQs, zones could be set up for recreational fishing, with some of these allowing only certain types of gear, similar to fly-fishing-only sections on trout streams, or for charter-fishing operations for certain species at certain times of the year. Near-shore areas could remain public-access zones to allow surf fishing, beach recreation, and other uses.

Certain areas offshore also could remain open access, to address concerns about “fencing off the last frontier.” Zones could be created for aquaculture, natural gas and oil operations, seabed mining, and offshore wind farms.

Rights to particular zones could be leased for certain uses for part or all of the year. Leases could be auctioned off to participants or grandfathered. Such auctions could generate an additional source of government revenue, just as the spectrum auctions have done. Fishing clubs or charter-fishing operations could purchase long-term leases that would guarantee their members or customers exclusive rights to certain areas. Offshore wind farms could join forces with offshore aquaculture operations to purchase the rights to certain areas. Environmental organizations could purchase leases to create private marine reserves that could complement government conservation efforts. And creating quasirights to areas could lead to the development of secondary lease markets. For example, an oil company might lease out the fishing rights in its zone, or a pharmaceutical company might purchase the rights for bioprospecting operations.

The number of uses of the marine environment is not going to decrease during your tenure, and as the number of stakeholder groups increase, so too will the need to address user conflicts. Zoning can address these conflicts in one of two ways:

either regulators could separate activities in a traditional command-and-control approach, or conflicts among the different stakeholder groups could be left to the lease markets.

Whatever the instruments used or types of uses allowed, a zoning system can be monitored and enforced with satellite tracking systems that either allow or lock out certain activities by various individuals at different times and places. Technology currently exists to “fence the ocean” electronically, if not literally.

Besides the many benefits in moving to a zonal approach, some transaction costs and uncertainties need to be considered. Changing the focus of current fishery management will require jurisdictional and institutional restructuring. Also, many marine species move great distances during their lives and will not stay within artificial lines “drawn” on the water. Flexibility in how zones are defined and managed, along with designing the system using the best available natural and social science information, is therefore critical for this—or for that matter, any—marine management framework to be successful.

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***A zonal approach can ensure both the efficient utilization and sustainability of the ecosystem.***

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## Conclusions

In an important sense, we are on the cusp of a revolution in managing marine resources. Our marine resources do not need to be threatened. Fishing companies and the communities they support do not have to go the way of old-growth logging towns. Future generations can enjoy the bounty of the oceans much as we do today. Reversing the current trends, however, will not be easy—many will not get what they want—but zoning is likely to be the least costly and most ecologically sound approach.

J.N.S.