

CRS Report for Congress

Marine Protected Areas: An Overview

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Summary

Some Members of Congress (among many others) are interested in considering limiting human activity in some areas of the marine environment as one response to mounting evidence of deteriorating conditions and declining populations of living resources. The purposes of proposed additional limits would be to both stem the decline and permit the rehabilitation of these environments and populations. One method of implementing this concept is to designate areas where activity would be limited, often referred to as marine protected areas (MPAs). Translating the MPA approach into a national program, however, requires resolution of many economic, ecological, and social debates.

The complexity of creating a program is compounded by controversy over the uses that would be allowed, curtailed, or prohibited in MPAs; the purposes of a system of MPAs; and the location, size, and distribution of MPA units. One possible way to get past some of these complexities is to think of MPA designations as a form of zoning in the ocean. Experiences in using the MPA designation in other countries may be instructive. However, questions have been raised about the effectiveness of administration and enforcement and about changes in living resources at some of these sites.

Although the MPA designation has not been used widely in the United States, numerous marine sites have been designated by federal and state governments for some kind of protection. Perhaps the best-known federal sites are units in the National Marine Sanctuary Program. The Bush Administration has supported the MPA concept. It designated the Northwestern Hawaiian Islands Marine National Monument in 2006 as the world's largest MPA and has supported the activities of the National Marine Protected Areas Center in the National Oceanic and Atmospheric Administration. It has continued most of the Clinton Administration initiatives to coordinate protection of marine resources at designated sites, including implementation of Executive Order 13158, issued in May 2000, which endorsed establishing and strengthening a comprehensive system of MPAs.

Additional actions by Congress would be needed to create a system that could be characterized as integrated or comprehensive. Recent reports from the Pew Oceans Commission and the U.S. Commission on Ocean Policy endorsed the MPA concept. Some issues that would likely be raised in any congressional discussions include whether new legislation is desired or needed; what the basic characteristics of units in any MPA system should be; how MPAs might be used to resolve use conflicts; and whether adequate funding would be authorized and appropriated to both enforce the protected status and monitor and evaluate the ecological and social impacts of MPAs. Earlier Congresses examined the concepts behind MPAs and experiences with protected areas as they considered appropriations and proposals to reauthorize coastal and marine resource protection laws. However, Congress has not authorized new MPA-related activities, although it addressed fishing access when it reauthorized the Magnuson-Stevens Fishery Conservation and Management Act near the end of the 109th Congress. The 110th Congress is likely to continue considering these topics. This report will be updated as events warrant.

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Marine Protected Areas: An Overview

Many coastal and offshore ecosystems continue to be degraded, and the effects of degradation are viewed as generally expanding, despite efforts to control or limit some of them. The causes of degradation are numerous, and can include:

- pollutants;
- runoff from land;
- coastal development;
- introduction of non-native or invasive species;
- overfishing and bycatch;
- aquaculture;
- habitat alteration; and
- rising sea level and climate change.

The public has been made aware of marine deterioration by widely publicized degradation, including a large seasonal “dead zone” in the Gulf of Mexico, declining populations of many popular fish species to levels that can not longer sustain commercial or even recreational harvests, and deteriorating coral reefs. These conditions appear to be expanding. Current approaches to managing resources in the marine environment often appear to have been ineffective, prompting a search for alternatives.

Some observers, often including scientists and environmental advocates, recommend designating marine protected areas (MPAs) as one way (possibly one of many) to achieve resource management and conservation goals in marine ecosystems. From their perspective, the designation of MPAs will not be a panacea that responds to all causes of degradation, or leads to a quick recovery for all degraded environments, but it can be an important component for protecting and restoring the marine environment. Policy makers are looking at how this tool has worked, alternative ways that it can be designed, and whether and how it might be broadly applied. Little opposition has been expressed about the overall concept of establishing MPAs, but some of the more specific discussions about which uses would be limited or prohibited have been more heated.

The 110th Congress is likely to take an interest in this concept as it considers reauthorization of laws to manage coastal zone and marine protection designations, as well as appropriations for marine programs. Additional interest may be stimulated because the Pew Oceans Commission made the MPA concept a cornerstone of its recommendations in its 2003 report,¹ and the final U.S. Commission on Ocean Policy

¹ Pew Oceans Commission, *America's Living Oceans; Charting a Course for Sea Change*, Arlington, VA (June 2003).

report also endorsed the MPA concept in a very wide-ranging report.² Also, the activities of the National Marine Protected Areas Center in NOAA, such as cataloging all marine protected areas in federal and state waters, could provide additional information that might attract congressional interest.

Background

The most visible and widespread support for MPAs is based on the hope that they could be an effective tool for restoring certain over-harvested fish populations. Not only does overfishing reduce populations of desirable species, but interactions with fishing gear can degrade habitat and other components of marine ecosystems. Among the most contentious aspects of designating and managing MPAs is deciding whether and where this tool might be appropriate for restoring fish populations; how to manage commercial and recreational fishing activities within and adjacent to MPAs; and whether and how access might be controlled.

Another widely discussed issue is the desire of some to limit or prohibit offshore energy activities, including extraction and transportation. This issue is highly visible, because for many years Congress addressed it annually in Interior appropriations, and because pictures of marine damage caused by oil spills from accidents around the world, often showing birds or animals soaked in oil in beautiful coastal areas, have had a strong impact on public opinion. In addition to limiting oil and gas activities, other arguments supporting MPAs have also been put forward, such as protecting or preserving outstanding natural and cultural features; promoting research and education; resolving use conflicts; and expanding tourism. Each of these perceived benefits has been raised in connection with one or more past proposals to add units to the federal National Marine Sanctuary system.

Additional motivation centers on the expectation that the intensity of many uses and the total number of uses in the marine environment will continue to grow, that this growth will exacerbate use conflicts and further degrade ecosystems, and that many of the effects will be concentrated in coastal and nearshore areas. Coastal and nearshore areas are among the most productive portions of the marine environment, are adjacent to valuable coastal property, and are the portion of the ocean most degraded by human activities. For example, several recent proposals to locate wind farms in offshore areas visible from prime residential coastal property raised the same kind of “not in my backyard” (NIMBY) responses that have been raised for decades in response to unpopular development, such as landfills, prisons, and transmission towers, in suburban areas. Use conflicts are not new to marine areas, and similar responses have been raised to proposed offshore energy developments in “frontier” areas where there is no prior history of such activity during the past 25 years.³ More generally, thinking about future activities in the marine environment raises questions about how uses should be monitored, whether new categories of uses can be

² U.S. Commission on Ocean Policy, *An Ocean Blueprint for the 21st Century*, Washington, D.C. (September 2004).

³ The recent passage of the Gulf of Mexico Energy Security Act, opening a new area in the eastern Gulf to oil and gas operations, provides some sense of how contentious these issues can be.

effectively addressed through existing laws and programs (an issue raised by wind farm opponents, for example), and how public and private interests should be considered in any decision process.

The positive view of proponents of MPAs is drawn from a combination of observations about their use by other nations, experiences with using similar approaches to successfully protect pristine areas and restore degraded environments in terrestrial settings, and the conclusions they may have drawn from the management of the numerous protected marine areas that already have been recognized by the federal government. The United States comes relatively late to this concept, as many other countries have been establishing MPAs far longer in other parts of the world. Success at these MPAs appears to vary widely. One explanation for this variation is that the MPA concept has been broadly defined to include many levels and types of protection and diverse goals. Another is that countries commit different amounts of financial and other resources to managing and monitoring these designations. Some scientists have cautioned that MPA proponents may be reaching conclusions about potential accomplishments of such designations that can not be supported by currently available information.

Little opposition has been expressed about the concept of MPAs. However, when this concept is translated into specifics, such as where a site might be located, or which uses and activities would be limited or prohibited, interests who would be adversely affected by such decisions express their concerns. In the past, opposition has been expressed by energy, fishery, and other interests toward National Marine Sanctuary proposals that would impose limits on resource use or removal, and similar responses can be anticipated in the future.

A 2001 National Research Council (NRC) study, the 2003 Pew Oceans Commission report, and the 2004 U.S. Commission on Ocean Policy all conclude that MPAs could play a central role in future management of the marine environment. The NRC study, which centered on fishery management and restoration issues, examined roles that marine reserves and protected areas for conservation of marine resources might play, including to conserve biological or habitat diversity; to sustain fisheries; to complement other management efforts; to ensure ecosystem services; and to protect cultural heritage.⁴ This study recognized that there are many other possible goals for MPAs, such as recreation, education, or research, but these received less attention as they were not a part of this study.

The Pew Oceans Commission report calls for establishing a system of marine reserves as an important component in efforts to restore and maintain healthy marine ecosystems. Marine reserves are very central to its recommendations. These reserves would play critical roles in “zoning” areas of the ocean under sovereign control based on desired patterns and intensities of uses. This report also recommends establishing regional ocean ecosystems councils and a new independent federal oceans agency.

⁴ National Research Council, *Marine Protected Areas: Tools for Sustaining Ocean Ecosystems* (Washington, DC: 2001).

The U.S. Commission on Ocean Policy also endorses MPAs, but its report is more wide-ranging than the Pew effort, and MPAs play a much smaller role in its recommendations. The MPA recommendations center more on coordination and the process for designation rather than the goals and benefits that could result if a system of MPAs were to be created.⁵

Numerous studies have looked at some portion of the MPAs that either are located in a specified area or protect one subset of marine resources. For example, the NRC study included a table reviewing the effect on fisheries at 27 sites around the world (including one domestic site, Looe Kay National Marine Sanctuary in Florida). It identified nine criteria used a total of 61 times to measure changes of fisheries, and showed which of these criteria were used by analysts for each site, and whether these analysts concluded, for each criterion, that conditions improved, remained the same, or worsened after the designation.⁶ Since these are all qualitative changes, there is no indication of either the pace or magnitude of change, or more specifically, exactly what has changed. Nonetheless, when these criteria were applied, improvements were reported in 47 instances, no change was reported in 12 instances, and decline or deterioration was reported in only 2 instances.

While these studies were being conducted, the federal government moved forward on the topic of MPAs. On May 26, 2000, President Clinton issued Executive Order (E.O.) 13158 to provide direction to the federal effort. This order created a National Marine Protected Area Center in the National Oceanic and Atmospheric Administration (NOAA) “to develop a framework for a national system of MPAs, and to provide Federal, State, territorial, tribal, and local governments with the information, technologies, and strategies to support the system.”⁷ The Center has been preparing an inventory of what it is calling “marine managed areas” (MMAs) and developing criteria for a national system of MPAs. It works with a national advisory group of recognized experts and publishes a monthly newsletter.

There does not appear to be any comprehensive worldwide catalogue of MPAs. Inventories could be useful if they enable public agencies at all levels of government and nongovernmental organizations to compare their experiences. Inventories also provide a sense of the range of types of protection and a composite of protections that are being provided. In an action in fall 2002 that received international attention in the press, Australia announced that it had established the world’s largest reserve around an island group near the Antarctic Circle encompassing more than 25,000 square miles. (The 2006 National Monument designation of the Northwest Hawaiian Islands by the Bush Administration is slightly larger.) Within the designation, Australia stated that it intends to further restrict fishing activity while strengthening surveillance and enforcement efforts.

⁵ For additional background on the U.S. Commission on Ocean Policy and the Pew Oceans Commission, see CRS Report RL33603, *Ocean Commissions: Ocean Policy Review and Outlook*, by Harold F. Upton, John R. Justus, and Eugene H. Buck.

⁶ National Research Council, pp. 85-87.

⁷ For information on the activities of this center, go to [<http://www.mpa.gov>].

Many proponents of protecting marine areas look for useful lessons from similar experiences in terrestrial settings. The national debate over protection of natural resources on land has a long, rich, and varied history, one that has been tied to public ownership and a complex array of federal and state resource protection activities and programs. The debate over marine areas, by contrast, started more recently and has generally been less intense. In both marine and land areas, debate continues over whether enough of the “right” areas are being protected, and exactly how much of which resource uses should be allowed in those areas. Many of the large environmental organizations, which have been very active in protecting terrestrial areas, are increasingly showing a similar interest in marine areas.⁸ Scientists, environmentalists, resource users, and others examine these questions through very different perspectives and reach very different conclusions. These debates may be easier to resolve for marine areas, where uses are more dispersed, less intense, and do not involve private ownership of land and rarely involve private control of resources, except in a few coastal areas.

The Concept of Marine Protected Areas

Overview. MPAs have been proposed to control resource uses in specified regions of the ocean for any of three general purposes. These proposals are being made more frequently and reflect greater awareness and knowledge about how MPA designations can be more effective. One purpose is to limit uses that are incompatible with protecting identified values, usually ecological or environmental. A second purpose is to create a setting where degraded habitats and reduced populations have the opportunity to restore themselves. A third purpose is to preserve healthy marine habitats and ecosystems from degradation by preventing overuse. The benefit most often cited by proponents of MPAs is protection and restoration of ecosystems generally, and more specifically, valued fish populations. Additional benefits may include new educational and recreational opportunities, expanded tourism, protection of cultural resources (shipwrecks, for example), and contributions to basic science and to improved environmental conditions.

MPAs have been defined in many ways. Definitions usually include three criteria: (1) geographically defined and bounded places; (2) approaches that manage systems rather than individual resources or species; and (3) approaches that take a long-term perspective on resource management. The definition currently being used in this country, found in Section 2 of E.O. 13158 on Marine Protected Areas, defines MPAs as “any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.” The MPA Center in NOAA is using this definition as it coordinates and leads federal efforts to develop a

⁸ See, for example: Natural Resources Defense Council, *Keeping Oceans Wild: How Marine Reserves Protect Our Living Seas* (New York City: 2001), 29 pp., World Wildlife Fund, *Fully-Protected Marine Reserves: A Guide* (Washington, D.C.: 2000), 131 pp., or The Conservation Law Foundation, *Marine Ecosystem Conservation for New England and Maritime Canada: A Science-Based Approach for Identifying Priority Areas for Conservation* (Boston: 2006), 18 pp.

framework for a national system of MPAs. The draft framework has undergone public review and its publication is scheduled for late 2007 or early 2008.

The E.O. 13158 definition may have been drawn, in part, from what is probably the most widely used definition in the world, developed by the World Conservation Union (IUCN) about a decade ago. It stated that an MPA is “[a]n area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.”⁹ Each designated area must be a minimum of 1,000 hectares. This definition is then applied to distinct categories of areas that reflect a wide range of possible management objectives. The IUCN specifies that sites meet this definition only when at least three-quarters of a designated MPA is managed for the primary category and management of the remaining area is not in conflict. The categories are as follows:

Category 1: *Strict Nature Reserve/Wilderness Area*, managed mainly for science or wilderness protection

Category 1a: Strict nature reserve managed mainly for science

Category 1b: Strict nature reserve managed mainly for wilderness protection

Category 2: *National Park*; protected and managed mainly for ecosystem protection and recreation

Category 3: *National Monument*; managed mainly for conservation of specific natural features

Category 4: *Habitat Species Management Area*; managed mainly for conservation through management intervention

Category 5: *Protected Landscape/Seascape*; managed mainly for landscape/seascape conservation and recreation

Category 6: *Managed Resource Protected Area*; managed mainly for the sustainable use of natural ecosystems

As one becomes more specific about possible goals and objectives for an MPA, the question of how MPAs will be defined quickly grows complex. They could involve state and federal jurisdiction, each with different goals and responsibilities. They could emphasize either some species (perhaps the commercially most valuable or the rarest ones) over others, or the general health of the entire ecosystem over maximizing the benefits to specified individual components. Among the questions currently receiving the most attention are: (1) will certain activities or uses be automatically prohibited at all places designated as MPAs, such as automatically closing them to all extractive activities, or will a list of permitted and prohibited activities be developed for each designated area or category of areas; and (2) will environmental conditions or resource uses beyond the boundaries of MPAs be managed to limit adverse effects on resources within MPAs?

Definitions are one way to convey expectations about the program. For example, one could conclude that most of the Gulf of Maine is protected by an

⁹ International Union for the Conservation of Nature and Natural Resources (IUCN). *Guidelines for Protected Area Management Categories*. Gland, Switzerland. 1994.

impressive web of designated areas protected for a variety of reasons. However, a closer examination shows that most of these designations protect a single commercial fish species or limit a specified activity such as exploration for oil and gas, and the composite of protection is less than it might have seemed on initial inspection.¹⁰ Some will want MPAs to be based on an inclusive definition to encompass designations where protections are limited to a few resources or uses, while others will want it to only apply to sites where many resources are strictly protected. Between these two possibilities are many alternative intermediate approaches. This debate over definition continues because the MPA concept has been used in many different ways. Several narrower terms are being used to describe types of places that provide high levels of protection, and they also have been used with different meanings. These places might also be called MPAs, although they are often expressed as if they were alternatives to MPAs. These terms include:

- *marine reserve*, where uses that remove resources are generally prohibited (these areas may also be called ecological reserves);
- *ocean wilderness*, like the terrestrial concept for wilderness areas on public lands where no alterations or activities that leave lasting impacts are permitted, but low-impact recreational activities may be permitted;
- *fully protected marine area*, generally a “no-take” area where a wide variety of extractive and consumptive uses/activities are prohibited;
- *national marine sanctuary*, a specific designation created in legislation more than 30 years ago and defined in regulations to include areas of special national significance due to resources or human use values that are designated to ensure conservation and management;
- *marine managed area*, managing for multiple objectives, where protection is not the only, and may not even be the prime, objective; and
- *marine park*, like the terrestrial concept for a park.

Managed Areas. NOAA’s MPA Center is in the process of building a domestic inventory of marine managed areas (MMAs) that it will then use as a basis for developing the inventory of MPAs that is called for in E.O. 13158. The definition of MPA is likely to be somewhat narrower, so not all MMAs are likely to meet the criteria that will be developed to designate MPAs. According to an August 2006 press release, there are more than 1,500 MMAs in the United States. A majority of the sites are established and managed by states. Of the federally controlled sites, 162 are units of the National Wildlife Refuge System, administered by the U.S. Fish and Wildlife Service. Sites under NOAA jurisdiction include the 14 designated marine sanctuaries, 36 sites protected by the National Marine Fisheries Service, and the 25 units of the National Estuarine Research Reserve System, which are located in state waters and managed by states. About 90% of the 1,500 sites permit access and

¹⁰ This may be one of the reasons why the Conservation Law Foundation and World Wildlife Fund Canada joined together to prepare their report on marine ecosystem conservation in these waters, cited in footnote 8.

multiple use, including fishing. Most are permanent, providing protection throughout the year, and most have been established since 1970.¹¹

This survey is the most recent and comprehensive inventory effort. An earlier inventory, assembled by staff at NOAA in 1998, looked at what portion of the marine environment in federal and state waters was protected. It identified 390 sites totaling almost 240,000 square miles protected in some fashion by federal agencies and 736 sites totaling 4,000 square miles protected by states (as well as 128 sites totaling more than 300 square miles protected by non-governmental organizations).¹² The overall area may seem large (it is about equal to Oregon), but these areas encompass only about 6% of the ocean floor that is within 200 miles of all states and territories, known as the Exclusive Economic Zone.¹³ Since 1998, additional marine areas have been protected in some fashion, and not always by the public sector. For example, in October 2002, an oyster company reportedly donated almost 18 square miles (11,500 acres) under water in Great South Bay along the south shore of Long Island to The Nature Conservancy to protect marine ecosystems.

The places included in these inventories are concentrated in coastal and nearshore waters. These areas are ecologically among the most productive and diverse marine environments and are sites of the most concentrated and intensive uses and alterations. Therefore, protection efforts (including efforts to designate MPAs) also have been concentrated in these same areas. Almost all coastal states have been addressing the pressures in or affecting state waters for many years, generally using their federally approved and funded coastal zone programs. A few states emphasize the marine side of their coastal zone, as management of ocean resources is one of the eight purposes for which states can receive “enhancement grants” under this program. However, most state coastal management programs generally concentrate their efforts on the land and shore side of the coastal interface.

An MPA designation may not have to mean that the entire site is administered by one set of rules. Many proponents have advocated a zoning approach, subdividing a site into subunits with different levels of protection, or protection for different purposes. Zoning would allow managing agencies to achieve multiple policy objectives. Subdividing sites is recognized in the IUCN definition, discussed above, through the structure of the categories. Zoning of a protected marine area to provide different levels of protection was probably first implemented by the Great Barrier Reef Marine Park Authority in Australia in the early 1980s, and has more recently been adopted elsewhere, such as the Florida Keys National Marine Sanctuary.

¹¹ Information on the inventory is at [http://mpa.gov/helpful_resources/inventory.html].

¹² Surveys are also being done at the state and other levels. For example, an inventory for Alaska was recently published, generally using the National MPA Center’s criteria. David Witherell and Doug Woodby, “Application of Marine Protected Areas for Sustainable Production and Marine Biodiversity off Alaska,” *Marine Fisheries Review*, v. 67, no. 1, 2005, pp. 1-27.

¹³ By contrast, the total dry land area of the states and territories is about 3.6 million square miles, and about 29% of that total or more than a quarter, about 1.0 million square miles, is protected in some fashion by a public entity.

Subdividing designated areas may be especially useful use pressures and activities are most concentrated.

The notion of zoning is well-developed on land, but there is little experience with what adjustments might be needed to apply it effectively in an aquatic environment. One reason is that this concept is at odds with the traditional view that the ocean is “free to all” and “boundless,” able to accommodate all uses in its vast expanses. This view, which was more widely accepted when technology to gain access to deep water resources was limited and the deep ocean was characterized as a vast and largely unknown “ocean desert,” has contributed to widespread support for treating the ocean as common property beyond territorial boundaries. In these offshore areas, the ocean has no owners and is considered to be managed as a public trust to benefit humanity.

In recent years, however, zoning has been getting more attention.¹⁴ This attention is a response to technological advances that permit greater access and more uses of the marine environment, including the water column, ocean floor, and subsurface resources. Nations have become more aware of the need to discuss how to manage uses that affect common property and open access resources, and how to distribute the benefits from exploiting those resources, and zoning is one component of these discussions. At the same time, scientific research is developing a more accurate accounting of baseline conditions in the marine environment and effects of technologies on these conditions. Policies that recognize these finite qualities are more likely to recognize the benefits of establishing MPAs.

Most coastal nations, including the United States, already have taken unilateral actions to assert jurisdiction over resources within 200 miles of their coasts. The United States established a 200-mile fishery conservation zone in the Fishery Conservation and Management Act in 1976 (FCMA), and created eight Regional Fishery Management Councils to develop management plans for those fisheries that are determined to require active federal management. This zone was superceded by the declaration of an Exclusive Economic Zone (EEZ) through presidential proclamation in March 1983 (Presidential Proclamation 5030). The EEZ applies to a broader range of resources and uses. In 1996 amendments to the FCMA, Congress authorized the Councils to designate and manage essential fish habitat. Some view actions by the Councils implementing this amendment as a possible basis for MPA designations.

Lessons from Terrestrial Experiences. Discussion of the MPA concept may benefit by drawing analogies with comparable terrestrial resource protection efforts, both to explain this concept in terms that more individuals are more familiar with and to recognize differences between aquatic and terrestrial environments. Terrestrial protection efforts have a longer and richer (and very contentious) history, can be directly observed, and are occurring at many more sites. The center of debate over these efforts has been tied to public land ownership. Frequent topics of debate include whether enough (or too much) and the “right” areas are being protected, and

¹⁴ Garry Russ and Dirk Zeller, “From *Mare Liberum* to *Mare Reservarum*,” *Marine Policy*, v. 27 (2003): 75-78.

whether the desired level and type of protection is being provided using parks, refuges, and the many other available designation options.

In both terrestrial and marine settings, scientists, environmentalists, developers, users, and others examine the question of resource protection from different perspectives, which lead most individuals in each group to reach vastly different conclusions. To simplify, many ecologists see the greatest benefits when large and interconnected areas are protected; environmentalists generally would like to protect large areas and provide more stringent levels of protection, including additional limits on access to those areas; and many local residents and economic interests would like protected areas to be more limited and managed to permit more uses that seem compatible.

One terrestrial designation is “wilderness,” and some have equated MPAs to the wilderness concept. The wilderness designation is applied by Congress only on federally owned land where there is little sign of human alteration, and often in places where there is little potential for large-scale activity; nonetheless, the National Wilderness Preservation System encompasses more than 100 million acres of federal land.¹⁵ Others appear to think of MPAs as more like national parks or wildlife refuges, where some compatible uses are allowed and higher levels of human use are expected. These are but two of many federal approaches to managing resources on federal lands.¹⁶ A discussion of alternative approaches in terrestrial situations also may be instructive in efforts to develop a definition of MPAs.

The rationale behind designating sites in both aquatic and terrestrial settings are similar: to protect resources from environmental degradation or overuse; to provide areas where specific biological resources can restore themselves (either with active intervention, or by leaving them alone); to conserve biological diversity; and to allocate resource access and use among diverse interests and users. Factors in marine systems that indicate the declining quality of ocean resources — that designations, such as MPAs, would seek to reverse — include water quality degradation, bottom alteration, coral reef die-off, and fish and marine mammal population declines; similar factors, including deteriorating air and water quality and declining animal populations, have been used to measure damage or deterioration and to justify a need for increased protection in terrestrial locations.

Knowledge about terrestrial and marine environments is not uniform. In terrestrial environments, far more is known about temperate areas than about the less accessible desert, polar, tropical, and alpine sites. In marine locations, more is known about shallow and nearshore areas than about deeper or more distant sites. In general, much more is known about terrestrial than marine sites. For example, discoveries of new mammals on land are now very rare while new fish species are being discovered every year, and there have been no discoveries on land that compare with the discovery of undersea heated vents and entire ecosystems — different from

¹⁵ See CRS Report RL31447, *Wilderness: Overview and Statistics*, by Ross W. Gorte.

¹⁶ For an overview of federal land management, see CRS Report RL32393, *Federal Land Management Agencies: Background on Land and Resources Management*, coordinated by Carol Hardy Vincent.

any other known living systems — that have evolved in those environments, which occurred only about 35 years ago.

Many terrestrial analogies do not appear to transfer smoothly to marine situations because of the substantial differences between marine and terrestrial environments. Differences center on the ability to observe change and the precision with which conditions can be measured, the ability to locate and administer precise boundaries, questions of ownership and control, and harvesting techniques and technologies. Changes in the marine environment are much more difficult to observe and measure with precision, and more expensive to monitor. The challenge of observation means that much less is known about the basic components of the marine environment, especially in deeper waters, and the available information is less complete.

In terrestrial settings, boundaries are easy to precisely locate, can be marked in many effect ways, and can be efficiently administered. Scientists generally have much better knowledge about where boundaries should be placed to benefit species and ecosystems, and about the implications of boundaries for biological resources in terrestrial locations. A boundary on land, such as a fence, can also be an effective barrier that helps keep undesirable or incompatible elements out and restrains desirable elements. In the ocean, more species, as well as other elements of the marine environment, move freely over large distances, and physical impediments to passage are less common. The concept of installing and monitoring a barrier to limit movement in the water column or along the ocean floor is not a practical management tool in most circumstances, and the idea of precise lines as boundaries is not so useful except in locations where there is a distinct physical change, such as the edge of a submarine canyon.

Ownership and control are viewed differently in marine areas, where there is little private ownership, although sections of land, especially in nearshore areas, may be leased. Within the territorial sea (within 12 miles of the coast line), the federal government and states manage the water column, ocean floor, and subsurface. From the outer edge of the territorial sea to 200 miles, an area known as the EEZ, governments can assert some jurisdiction. Governments also protect environmental quality, and lease the surface and subsurface for numerous activities, most notably oil and gas extraction and fish harvesting. Beyond the territorial sea, the long-accepted tenet that all nations should have access to the ocean and its resources, and that resources should be managed for the benefit of humanity, remains accepted more widely, although how to translate this broad concept into actual management efforts has proven elusive.

Resources are harvested differently in terrestrial and marine environments. In terrestrial environments, animals raised for human consumption live in controlled conditions, are often very densely concentrated, and are raised and harvested under precise parameters. On the seas, by contrast, harvesting these resources is far less selective and far less efficient. Aquaculture attempts to replicate many of the economic benefits of terrestrial farming, but only has worked for a few species, and only under certain physical and economic circumstances. Harvesting in marine environments can result in significant bycatch of non-targeted species as well as alteration of the ocean floor. On the other hand, terrestrial harvesting is based on

dense concentrations of identical animals, be they fish, fowl, or livestock, which raises concerns about environmental quality and animal rights that do not occur generally in the marine environment. Terrestrial analogies to ocean harvesting, while imprecise, might be the equivalent of harvesting free ranging animals, such as deer or elk.

A recognition of major differences, such as the ones discussed above, that make drawing analogies for how to manage marine resources environments from terrestrial experiences difficult leads to several general observations. One observation is that applying the concept of adaptive management, which is currently favored in many terrestrial systems where resource management efforts are frequently adjusted as new information becomes available, will be more difficult to administer in the marine environment because of the general lack of information and the cost and difficulty of obtaining information. This more flexible approach to resource management, which is viewed by many scientists and other experts as more effective and efficient than traditional approaches, may not be a feasible option in many marine settings. A second observation is that some might conclude that management of marine resources should incorporate a greater margin for error to offset less precise knowledge about existing and changing conditions, and less ability to observe and measure change.

Even with all these differences between these two types of environments, terrestrial experience in resource management may be instructive in some instances. For example, mobility is an extremely important consideration when attempting to protect either migratory bird species or migratory fish species. Efforts by scientists and the U.S. Fish and Wildlife Service to identify and protect critical sites along routes of travel that have resulted in larger populations of migratory bird species may offer some useful lessons for deciding where protected marine sites should be located.

When the differences are considered in composite, management in marine environments may center on leaving resources alone rather than either initiating proactive actions, such as improving habitats or migratory corridors, or very precise management regimes that require extensive monitoring. However, other differences may make management decisions easier to resolve in the marine environment, where uses are more dispersed, less intense, and do not involve private ownership. When considering the MPA concept, questions must be answered that are similar to the debate about the goals for terrestrial protection and restoration of biological resources, including the number and size of units, the degree of ecological or physical representation, the desirable portion of the total area that should be protected, how to identify and respond to incompatible or undesirable uses, and how to measure actual changes over time.

Challenges to MPA Siting and Design. Translating the concept of MPAs into a viable program would present multiple challenges. Many of these can be documented by tracking the experiences and issues addressed at both NOAA's MPA Center and at other organizations around the world charged with MPA-related responsibilities, or by reviewing the types of controversies that have been raised when marine sanctuaries have been proposed. An initial set of challenges centers on

selection of sites. The approach to establishing MPAs often reflects the answers to several questions.

- What criteria (e.g., representative habitats, ecological integrity, social acceptability, degree of degradation, diversity of species, presence of endangered species) should determine MPA locations, sizes, and boundaries?
- Should MPA locations be selected using a single or several different approaches (choices include representative or diversity approach, hotspot approach, social acceptability approach, threat-based approach, opportunistic approach, and degradation/recovery approach)?
- Should particular species or ecosystems be protected? If protection is based on ecosystems, can only portions be protected, both because it is almost impossible to protect an entire ecosystem in such a dynamic setting, and because migratory species move across many ecosystems?
- Should boundaries of an MPA be decided based on geographic areas or on ecosystems, which are often fragmented? If an MPA is adjacent to the coast, could it also include waterways that drain into it or associated terrestrial areas?
- Should sites that are already protected under other designations with purposes that are similar to MPAs be given a higher priority to receive an MPA designation, or lower since they are already protected?

These challenges are only a fraction of the siting issues. Many of the areas that are likely to be considered for MPAs already have had extensive human use, and effects of these uses is frequently a source of pressure for designation. In these places, the management goal is typically restoration, which may require efforts beyond the mere act of site designation, although even considering a designation proposal can be controversial. As noted above, proposals to designate units under the federal National Marine Sanctuaries Program have generated controversy as interests who would have their uses curtailed by the designation oppose it either because they believe they are not the cause of problems or because they state that they can adopt acceptable practices that would permit them to continue using resources within the site. The designation process, which has lasted multiple years in some cases, has provided ample opportunity for protracted debates among all interests, or stakeholders, and some proposals have been rejected because of an inability to resolve these conflicts.

A hallmark of the marine sanctuary designation process (and many other processes that could lead to protecting natural resources) has been a perception of inequities among the various stakeholders. This perception of inequities is often manifested in a belief that socio-economic harm will be concentrated locally, and that the broader social good is being provided at the expense of local stakeholders and their opportunity to earn a livelihood. In marine areas, this perception is amplified for those who believe that either marine resources are common property and the government should not intervene to complicate individual decisions about levels and characteristics of use, or when traditional uses of long standing will be curtailed.

Taking a different perspective based on a view that federal intervention can have benefits, at least one attorney has argued that the 1906 Antiquities Act, which allows the President to unilaterally declare locations of scientific or historical interest as national monuments, should be used to designate protected areas in the marine environment expeditiously. This observer notes that even using this law, success will still require “negotiation, education, and consensus-building” including congressional funding commitments and involvement of local committees representing interested and affected parties.¹⁷ Use of this act would likely raise the same type of objectives that have been voiced in the past over unilateral action without the opportunity for public input and debate.¹⁸ However, when the Bush Administration used it in 2006 to create the Northwestern Hawaiian Islands Marine National Monument, including the proposal to phase out commercial fishing in five years, there was little public outcry.

The success or failure of MPA designations is far more likely to reflect socioeconomic, cultural, and political factors than biological considerations. Perceptions are likely to be positive for stakeholders (including resource users), if designations are viewed as based on: a fair, equitable, and transparent process for establishing and managing sites; clearly stated goals for the site; and expanding benefits while containing costs. Accurate discussion of these factors is difficult for sites in marine environments, where the inability to observe and measure change means that competing views about conditions are hard to resolve and expensive to verify. In one example, a study compared a successful National Marine Sanctuary designation in American Samoa with an unsuccessful one in Puerto Rico, and attributed much of the difference in outcomes to the attention given to local cultural, social, and economic circumstances and institutions. One such difference was that success required retaining a local voice in management decisions.¹⁹

Measuring economic changes and considerations in marine areas is also complex. This complexity is apparent in the discussion of the economics of a reserve for fisheries in the NRC report, which examines six topics: yield, displacement of activity, enforcement, management, economic activity, and non-market values.²⁰ Many of the costs that would result from establishing an MPA can be measured in market terms; fishermen, for example, will have increased costs if they have to travel greater distances and spend more time to reach new fishing grounds. But many of the benefits of taking such action are measured in non-market terms, such as larger populations of various species and improved habitat quality that attract divers to one location over another, or a research site that will not be altered by human activity. In addition, there may be historical and cultural benefits, such as from the presence

¹⁷ Jeff Brax, “Zoning the Ocean: Using the National Marine Sanctuaries Act and the Antiquities Act to Establish Marine Protection Areas and Marine Reserves in America,” *Ecology Law Quarterly*, v. 29, no. 1 (2002): 71-129.

¹⁸ See CRS Report RS20902, *National Monument Issues*, by Carol Hardy Vincent.

¹⁹ S. J. Fiske, “Sociocultural Aspects of Establishing Marine Protected Areas,” *Ocean and Coastal Management*, v. 17, no. 1 (1992): 25-46.

²⁰ National Research Council, p.59.

of shipwrecks or other artifacts, that attract interest (and tourists), but the value is difficult to measure directly.

Analysis of the economics must also assess spillover effects, where some portion of populations within the reserve migrate into surrounding waters where they can be harvested. These effects may be substantial, but also may be difficult to account for. For fishermen, these effects may involve some combination of higher pressure to harvest species in nearby areas (a cost) with larger overall catch or larger fish on average because of the sanctuary provided by the designated site (a benefit).

Challenges for MPA Management. A continuum of possible management options in MPAs is available, as mentioned earlier, from no or few restrictions on access or uses to prohibiting all access and potential uses, reflecting different visions for goals and objectives of the MPA (or system of MPAs). In addition, different parts of the same MPA could be managed for different levels or types of uses, or there could be different types of designations within a system, as reflected in the IUCN categories listed earlier. Use of the term MPA could encompass a wide assortment of protections applied to marine and coastal resources that may be exercised over a specified area. Thus, examples of MPAs could range from a defined area of the Chesapeake Bay that has limits on the number of commercial crab pots used, to a state park in California that restricts public access at coastal beaches and waters, to a Marine Sanctuary that prohibits anchoring on coral reefs, or the definition could exclude one or all of these types of protections.

Choosing which mechanism will be used to manage human activities so that the appropriate level of protection is provided can generate numerous contentious questions. One set of these management questions centers on what uses should be permitted and which ones should be prohibited. For economic endeavors, like commercial fishing, there are many options to control or limit effort, and to harvest the resource, and these considerations vary widely among the many species that are commercially harvested. How should permitted activities within MPAs be regulated; should some uses be allowed under some but not all circumstances; and should access be limited under certain circumstances? Should permitted activities and uses in these areas change seasonally or in some other cycle? What management activities (e.g., enforcement, research, monitoring, restoration, education) are necessary at MPAs, and is there a distinction between what is minimally necessary for the site to function and the level of effort that would be desirable? With proper management, certain areas within MPAs might be designated for specific activities, with the managing agency having the authority to curtail or halt activities whenever necessary.

Many supporters of MPAs view this designation as a way to protect the integrity of an entire marine ecosystem in addition to protecting individual species or components. This may be based on the belief that more fractured approaches to dealing with resource management specie by specie or component by component have been ineffective. Some proponents of a system of MPAs believe that it will only be effective if it includes representative areas encompassing all important habitats in a biogeographic region. This approach is already being applied to the National Estuarine Research Reserve System, a component of the Coastal Zone Management Program. These proponents may advocate that consumptive exploitation be prohibited (i.e., no-take areas) throughout each MPA in a system, or

only in designated portions of especially high value. These proponents claim that no-take areas are vital for baseline and comparative studies, and would play an important role in conservation and management of rare or commercially important species.

Creation of MPAs, like public designation of almost any area in recognition of socially valuable resources, raises three broad sets of management issues where stakeholders may have very different expectations. One set of management issues centers on how these expectations might be met, especially since they may not always be compatible, and may even be mutually exclusive. These expectations are likely to be expressed, in part, through participation in the development and implementation of a management plan that would protect the site's resource values. Stakeholders who must comply with the provisions of a plan will express views about reasonableness, enforcement, costs and benefits, and the like. Achieving compliance with a plan from users can be a challenge if input from all members of that community had not been solicited in developing the MPA. Dissatisfaction from key members can be a critical factor in eroding confidence in a management authority.

A second set of management issues revolve around what the managing agency will be trying to accomplish in each site, as well as any system of sites. Questions related to balancing resource use and conservation are vital because marine natural resources and their living space are sought by many different users for many different purposes. Decisions will also need to be made about whether MPAs should primarily protect pristine sites or restore damaged sites, or do both. Restoration of specific species or entire ecosystems could be a major activity at MPAs. Restoration could be primarily passive, as managers allow natural processes to occur at their own rates and patterns, or managers could actively work to create a desired ecosystem or an optimum environment for preferred species. An example of active restoration is efforts to increase waterfowl populations at many units of the wildlife refuge system, which are referred to as "duck factories" by some. If restoration is a major activity, it usually requires that the source of damage be identified and addressed.

Sufficient staff and financial resources will need to be committed for MPAs to be successful. A lack of resources would make it far more difficult for MPAs to achieve their objectives, and could result in what are referred to as "paper parks," which can be little more than designations on a map. Among the problems that have occurred in some designated areas are a lack of financial and technical resources, lack of a trained staff, lack of enforcement, and lack of needed management information. Any of these deficiencies can lead to insufficient capacity to meet objectives. If the gap between what defines success and what can be done becomes too great, potential users may not respect the designation and advocates of the designation may look for other vehicles that will provide the levels and types of protection they are seeking. It is unclear whether MPAs would be established with either performance standards to be met, or goals around which they are managed, and if there will be any penalties if standards are not attained or goals are not met. In locations where competing users can apply strong pressure, or there are many users, administrative costs could be especially high.

A third set of management issues revolve around monitoring and enforcement. The managing agency will need a legal mandate and financial and other resources to perform these functions. Two possible purposes of monitoring could be to gather the

information necessary to be made aware of any threat that is incompatible with the MPA or its resources, and to document changes that are occurring over time. An agency will need to be made responsible for enforcement. The primary enforcement agency in marine areas has been the Coast Guard. If it is assigned this additional responsibility, what priority will it be given in the post 9/11 world? Enforcement actions being taken in protected marine areas currently have been generally receiving little publicity.²¹ Enforcement of management rules would be easier and perhaps less expensive if there is strong community support for an MPA, and especially if stakeholders are supportive enough to make enforcement largely self-policing.²² In addition to support by stakeholders, surveillance and enforcement efforts require the cooperation and coordination of many agencies. These and related issues and challenges are addressed in a recent MPA Center report.²³

These three broad areas of management issues must be viewed in the context of knowledge about the marine environment. Managing these resources poses significant scientific and economic challenges because often little is known about specific physical conditions in the water column and on the ocean floor, the life histories of many species, and the complex interactions between biotic resources. Monitoring uses and changing resource conditions, and enforcing limits on various uses will be more expensive and time consuming in marine areas than it would be on land. Effective administration will require adequate human and financial resources, and equipment, such as boats and expensive electronic gear. An important aspect of administration will be to continue to measure the costs and benefits of a designation after it is established, and to educate stakeholders about these values.

Knowing whether an MPA system has been successful will depend on an ability to evaluate accomplishments. Many scientists and proponents of MPAs have discussed alternative approaches for evaluation. The IUCN is preparing a guidebook that will provide a framework to evaluate MPA accomplishments. The method in the guidebook, which is still in draft and is being field-tested, considers biophysical goals, such as sustainable fisheries and conserving species and habitat, and socio-economic goals, such as job opportunities, non-market benefits, and awareness and knowledge. Other researchers are considering alternative approaches.²⁴

Fisheries and MPAs: A Driving Force and the Center of Controversy. The role that MPAs might play in fisheries management is at the

²¹ An example of enforcement is in a press release issued by the Florida Keys NMS on March 14, 2002, noting that NOAA had levied fines totaling \$112,000 against eight vessels for shrimping or fishing in the Tortugas Ecological Reserve. Such announcements, however, have been uncommon.

²² In New Zealand, a private company has been involved in teaching commercial fishermen their obligations and responsibilities for maintaining and complying with environmental law, seeking to teach responsible compliance as an alternative to enforcing regulations on an industry.

²³ National Marine Protected Areas Center, *Enforcing U.S. Marine Protected Areas: Synthesis Report* (Washington, DC: 2005), 67 p.

²⁴ See, for example, Jacqueline Alder, et. al., "A Method for Evaluating Marine Protected Area Management," *Coastal Management*, v. 30, no. 2 (2002): 121-131.

heart of many discussions, and continues to be vociferously debated. How to manage commercial and recreational fishing within and adjacent to the MPA is contentious both as a general topic and when specific sites and specific fisheries are being considered. The National Research Council was asked to address relationships between fisheries and protected areas in its study. Part of the current debate is over who benefits and who is harmed when access is limited to valuable fishery resources. Not surprisingly, some of the strongest opposition to MPAs and questions about any limits on access is raised by those fishing interests, who could be adversely affected by a designation. The strongest and most vocal support often is based on the potential role for MPAs in protecting and restoring fishery populations by limiting the efforts of commercial and recreational fishermen.

Over-exploitation of resources can degrade habitat and reduce resource abundance. The degree to which commercially valuable fishing stocks have been overused, leading to drastic reductions in populations, has been widely publicized for specific stocks. Early in 2003, a study concluded that many of the world's major fish stocks had fallen to 10% of their historic levels.²⁵ This study concluded that the comprehensiveness and magnitude of loss is higher than earlier studies had concluded.

Supporters of MPAs see the potential for many benefits. As the fisheries issue is so central to the MPA debate, both the Pew Oceans Commission and the National Research Council studies focused on the benefits to fish populations of MPAs.²⁶ The benefits of MPAs identified in these studies include:

- protecting individual species and biodiversity more generally within MPA boundaries;
- managing commercial fishery populations by controlling harvest rates and protecting locations where populations congregate at critical points in their life cycles, such as where they spawn;
- reducing damage to habitat;
- protecting rare, threatened or endangered species;
- preserving or restoring the viability of representative habitats, and
- protecting portions of larger ecosystems from over-harvesting.²⁷

Fishing presents complicated scientific, social, and economic questions, and those complications are amplified by the political strength of the recreational and commercial communities in marine management deliberations. The central question is whether fishing will be allowed, limited, or prohibited. Will decisions on fishing be made on site-by-site considerations, or will there be a single policy that applies to

²⁵ Ransom Myers and Boris Worm, "Rapid Worldwide Depletion of Predatory Fish Communities," *Nature*, v. 423 (May 15, 2003): 280-281.

²⁶ The U.S. Commission on Ocean Policy, by contrast, has a single general recommendation on protecting key fisheries habitat, and does not identify the MPA concept specifically in that recommendation.

²⁷ Stephan R. Palumbi, *Marine Reserves: A Tool for Ecosystem Management and Conservation*, prepared for the Pew Oceans Commission (Palo Alto, CA: Stanford University, 2002), 44 pp.

all units of a system? If fishing is to be allowed, several other questions may need to be addressed, including what differences, if any, should be made in regulating commercial versus recreational fishing; whether certain fishing techniques should be limited or prohibited because they are destructive to aspects of the marine environment; whether fishing should be limited to certain seasons or to a certain number of participants; and understanding the full range of the effects of an MPA on the economic, social, and cultural well-being of nearby coastal communities.

For all the discussion of how protected areas will benefit fisheries, there remain large uncertainties, especially about what exactly the effects might be on the size and characteristics of fish populations and on ecosystem components more generally as a result of a designation. Two common presumptions are that fish will grow larger if they remain in the protected area, and some are likely to stray into adjacent unprotected areas at times. Ranges of fish species vary widely, but for many species, this might be analogous to managing bison herds on federal lands in the West that sometimes wander onto adjoining private lands; in that case, unlike fisheries, close monitoring is based on a concern that bison may transfer disease to cattle herds. Protected habitat in designated areas may not work equally well for all marine animals, as the modified system may favor a new grouping of species, and returning the site to its former condition will not help some species. Beyond the science, there are also questions about how this concept can be integrated with other resource management tools, such as fisheries management plans and fishery regulations.

A lack of coordination between protected site management and fishery management, as reportedly has occurred between the National Marine Sanctuary Program and NOAA Fisheries at some designated sanctuaries, remains a potential problem that will likely resurface, unless specifically addressed. Better coordination between these units of NOAA could result in MPAs being designed with fisheries and other marine resource uses in mind. With this kind of coordination, the fisheries community might be better able to work with other interests who are concerned about how a designation might restrict various activities, including anchoring vessels; discharging wastes, pollutants, pesticides, fertilizers, and other materials into waters; protecting endangered species and marine mammals; permitting mariculture operations; collecting specimens; and diving, boating, and wading for recreation. Balancing the needs of conservation with the social, economic, and environmental interests of current users as well as the rights and opportunities of future generations is the essence of resource management. Even if all these topics are addressed, however, elements within the fisheries community may still disagree with the final decision if other values are protected at the expense of fisheries.

Critics suggest a dire situation has resulted from the current approach to fishery management, believing it has failed to protect many of the most valuable and popular populations from overfishing and depletion. While some view MPAs as a possible new tool for fishery managers to protect breeding stock and nursery areas, others caution that MPAs should not be viewed as a “quick fix” to the composite of activities that has resulted in overfishing.

The possibility of adopting MPAs as an approach to managing the marine environment and proposals for MPA-type designations fuel the debate over conflicting views of how no-take areas and other limits or controls might affect fish

populations, since various effects of MPAs on fish populations have been reported in the limited literature on this subject.²⁸ Protected areas, such as MPAs, appear to be most beneficial (i.e., promoting increases in abundance, size, and/or diversity) to sedentary, reef-associated species; or more generally, to species which strongly associate with certain habitat features that cause these species to restrict their movement to this habitat. In these situations, species benefit if unique habitat can be identified and protected. These studies are not uniform in their results, however, and some interests, centered in commercial fisheries, emphasize how such a system might not provide the magnitude of benefits its proponents claim. Indeed, some fisheries experts conclude that more traditional approaches to fisheries management, such as size limits, catch limits, or seasons, are more effective management tools than establishing places where fishing is prohibited for a large majority of all fish stocks.²⁹

Considerable scientific and social debate continues on the potential merits of MPAs for more migratory and transient species. In this debate, fishing interests question whether larger MPAs to encompass more of a wide-ranging species' habitat potentially necessary to be beneficial would have unacceptable socioeconomic consequences. An important element in this discussion of possible tradeoffs is the recognition that MPA designations can displace resource use from the protected area to nearby areas, either transferring or raising new management issues that arise from reallocation of the fishing effort. It may be that without other management actions, protecting one area will lead to overuse or excessive harvest in other areas, moving rather than resolving the biological management issues.

Recent studies from around the world generally show MPAs have beneficial effects not only on commercial species, but entire marine biological communities. The compilation in the recent NRC study documents this conclusion. Effects do vary among species, and short-lived and fast-growing species that migrate little during their life cycles tend to benefit most rapidly from inhabiting protected areas. It is also important to remember that, because effects differ, designations probably would not have the same results for all species in all situations.

If fishing and other interests all endorse MPAs, they are likely to be doing it for different reasons. If MPAs are successful in providing habitat that leads to resuscitating populations to a size that supports commercial harvest, they may raise other conflicts, such as: when to reinstate harvest; the appropriate size of the harvest; if and how the fishery should be restricted in the future; and whether the basic categories of users (commercial harvesters, recreational users, and Native Americans) should be treated the same or differently.

MPAs and Climate Change. Global climate change is being forecast to alter the ocean environment in many significant ways, including higher water

²⁸ Some of these studies are catalogued on NOAA's website for marine protected areas, [http://www.fknms.nos.noaa.gov/news/research_updates/mpa_facts.html]. This site is updated regularly.

²⁹ D. Robert L. Shipp, *Take Marine Protected Areas (nMPAs) as a Fishing Management Tool: A Programmatic Perspective* (Alexandria, VA: 2002). A Report to the FishAmerica Foundation.

temperatures, shifting ocean currents, and elevated sea level. Some alterations seem less certain than others, and the magnitude of some of these alterations will depend on the rate and extent of climate change. MPAs may prove to be useful in helping some living marine resources to respond to these changes.

Other Benefits of MPAs. While debate about the benefits and costs of MPAs center most frequently on the role they might play in the recovery of fish populations, they could provide other benefits. Some benefits could accrue at some or all MPAs, while others occur only if a system of sites is designated. In addition, if sites are managed only to expand fish populations, other potential benefits may not be realized. Some of these benefits may be far more speculative than others.

- MPAs could be a source of baseline scientific data about current and changing conditions in the marine environment, and serve as a system so that baselines and changes could be compared among locations. In this capacity, MPAs would provide a set of benefits not unlike one of the purposes that was articulated in legislation creating the National Estuarine Research Reserve System, a component of the federal Coastal Zone Management Program, discussed below.
- MPAs could serve as education destinations, providing opportunities for diving to observe the marine environment. Related on-shore support centers could be developed to inform a larger segment of the general public about resources protected in an MPA and the benefits that accompany the protected designation.
- MPAs could provide other environmental services, such as sequestering carbon, providing improved habitat for corals, expanding mangroves that could dampen the damages from coastal storms, purifying water and responding to chemical and oil spills through bioremediation. Some of these benefits may be very speculative.
- MPAs could protect cultural artifacts, such as shipwrecks and other places of historical significance, including places held sacred by native peoples. It is interesting to note that the first national marine sanctuary was designated to protect the site where the remains of the Civil War ironclad, the Monitor, came to rest after sinking in 1862 off North Carolina.
- MPAs could become an attraction that makes them destinations for tourists and recreation activity. Activities that may take place in MPAs or in nearby shore facilities, such as aquaria or museums. A unit in the National Park Service system, Buck Island Reef National Monument, with its snorkeling trail, is such a place.

Current Federal Laws and Programs

No current federal laws and programs protect marine areas as comprehensively as many of the proponents of MPAs envision for this concept. Many of these laws have limited geographic reach (applying only in state or federal waters), or the limited number of uses or activities that are controlled (such as a focus on fishing). However, most of these laws could play significant roles in a more comprehensive effort. Using them in combination without amendment likely would not lead to a

seamless system of MPAs, if past efforts to combine existing programs (each with different purposes) to serve a new purpose is any model.³⁰ This discussion does not include state laws and programs, which vary widely, and would become important for MPAs that include nearshore areas or have some interaction with activities in areas under state jurisdiction.

The following laws allow designation of protected areas in the marine environment, and most apply to coastal sites, but they were enacted for different purposes and take different approaches.³¹ If Congress chooses to authorize an MPA system, it might conclude that one or some combination of these programs can provide the basis for such a system, or it might conclude that it should enact entirely new authorizing legislation.³² Any resulting legislation could draw from the experiences of each of these programs.

National Marine Sanctuaries Act (NMSA). The NMSA (16 U.S.C. §§ 1431, *et seq.*) comes closest to authorizing what many proponents envision as MPAs. It authorizes NOAA to designate specific sites for comprehensive and coordinated management and conservation. The broad NMSA mandate allows NOAA to designate areas to preserve or restore conservation, ecological, aesthetic, or recreational values of the designated areas. It requires the development and implementation of management plans, which serve as the basis for prohibiting or limiting incompatible activities. The NMSA mandates that if additional protection is necessary, the sanctuary program must first consult with the appropriate agencies and constituents. The NMSA includes many provisions that limit its application geographically and over the activities of any foreign vessel or foreign national.³³

Thirteen sanctuaries have been designated, ranging in size from less than a square nautical mile to more than 100,000 square miles. Each site was designated for a specific reason, ranging from protecting cultural artifacts to protecting entire ecosystems. At most of these sites, particularly contentious questions when developing or amending management plans have centered on which activities will be incompatible with the purposes of the designation, and how incompatible activities will be limited. Since the management plans and regulations have been developed individually for each sanctuary and each sanctuary was established for a specified

³⁰ Wetland protection efforts are an analogous situation, where there is no single federal wetland protection law. The many laws that address wetland protection do not apply uniformly to all areas defined as wetlands by scientists, and the coverage of where each law applies varies widely.

³¹ For a more detailed review of current federal programs and laws, see National Research Council, "Chapter 8: Historical Background and Evaluation of Marine Protected Areas in the United States," pp. 145-173.

³² For example, the IUCN adopted a framework in the mid 1990s for protected marine areas that identified eight categories of areas. For each category, it provides a definition, management objectives, selection guidance, and preferred management responsibilities. These categories are listed, with little additional detail, on page 5 of this report.

³³ For a detailed review of the legislative history of the NMSA, see William L. Chandler and Hannah Gillelan, "The History and Evolution of the National Marine Sanctuaries Act," *Environmental Law Reporter*, no. 34 (2004): 10506-10565.

reason, they vary widely in how uses are managed and what uses are permitted. The Florida Keys Sanctuary is cited as one location where the MPA concept is being applied. Within this sanctuary, 24 sites amounting to 6% of the total area have been set aside as fully protected places where harvesting marine life is greatly restricted. However, this is an exception, as few of the existing sanctuaries restrict fishing, shipping, or recreation, although most prohibit oil and gas exploration and development. This has led some to characterize sanctuaries as more like multiple use areas rather than areas where no uses are allowed that could damage the marine environment.

Using sanctuaries to protect and restore fishery populations has been debated in recent years. Fishing can be regulated in sanctuaries, although this has rarely occurred. In considering whether to regulate fishing, the NMSA provides the appropriate Regional Fishery Management Council the opportunity to determine whether sanctuary fishing regulations are needed and to prepare draft fishing regulations. The Secretary of Commerce must accept the Council's proposals or determinations unless they fail to fulfill the purpose and policies of the Magnuson-Stevens Fishery Conservation and Management Act, as amended (discussed below). Regional Councils have supported only a few areas that have been completely closed to all forms of fishing. As sanctuaries revise and update their management plans, whether and how to limit fishing is likely to receive more attention at many of them. In this setting, some MPA proponents do not view the sanctuary system, as it currently exists, as an effective approach for fish recovery efforts.

Coastal Zone Management Act (CZMA). The CZMA (16 U.S.C. §§ 1451 *et seq.*) established a coastal zone management program and an estuarine sanctuary program, now called the National Estuarine Research Reserve System, and made 35 states and territories eligible to participate. The coastal zone management program provides grants to these states and territories to develop and implement plans that address several broad categories of development and resource protection activities in a state's coastal zone. Incentives to participate are not only these modest grants, but also a consistency provision that requires federal actions in or affecting the coastal zone to be consistent with federally approved plans. These incentives appear to be sufficient, as only one of the 35 eligible states and territories, Illinois, is currently not participating.

Protecting marine areas can be addressed by states using coastal zone enhancement grants. These grants are available to participating states and territories who are successfully implementing programs and wish to do more. These grants are available for nine program areas, one of which is "planning for the use of ocean resources." A report from NOAA reviewed activities under this program area for 1992 through 1996, and found a majority of states had some level of activity.³⁴ But the organization of the report makes it difficult to determine how designation and

³⁴ U.S. Department of Commerce, NOAA, Office of Ocean and Coastal Resource Management, Coastal Programs Division, *State Enhancement Grant Assessments and Strategies: Ocean Governance* (Washington, D.C.: Oct., 1999), 63 p. NOS/OCRM/CPD 990-08

management of protected areas in state waters fit into the activities of these states, or even where it might be occurring.

The National Estuarine Research Reserve System is a component of the federal coastal zone management program. States identify research reserve sites in state waters and, after federal approval, manage them. Even though this program is part of the CZMA, states that were not administering a federally approved coastal zone management program at the time proposed research reserves and received federal approval and funds. States with research reserves have integrated them into their coastal management efforts, although all research reserves do not play identical roles.

The 25 National Estuarine Research Reserves that have been designated were federally approved, in part because they each represent one of the diverse estuarine ecosystems of the marine coast (including the Great Lakes). Each site is suitable for long-term research, conservation, and education programs. The program is viewed as both providing a laboratory for research and education programs that help states and communities address coastal resource issues, and creating a network that permits research comparing biological or other characteristics at multiple units of the system. Incompatible uses that would compromise the value of research reserves for these three types of programs, such as more intensive development along the shore or major navigational improvements in the waters, are controlled or prohibited. Each research reserve operates under a management plan; ecological restoration is a goal at many of them. The research reserves range in size from 365,000 acres to 571 acres. NOAA is considering two additional proposals for reserves.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The MSFCMA (16 U.S.C. §§ 1801 *et seq.*) established federal fishery management authority in a zone extending from the outer boundary of state coastal waters to 200 miles from the U.S. coastline. It included the authority to regulate fishing effort up to and including closing areas to protect significant spawning and rearing habitats.³⁵ Such closures, which are often a response to overfishing, may be of limited duration or permanent, and they may affect some or all fishing activity covered by federally approved fishery management plans. Closures are usually imposed by NOAA on the recommendation of a Regional Fishery Management Council. Since the overarching purpose of the MSFCMA is to promote sustainable commercial and recreational use of renewable fishery resources, complete area closures remain uncommon.

Implementation of marine reserves as an element of fishery management seems to be gaining interest among the Regional Fishery Management Councils. As recognition that selective protection of unique habitats can benefit multiple species grows, Regional Councils are beginning to consider and create longer-term marine reserves (for examples, see “Recent Administrative Actions,” below) in lieu of temporary fishery closures for individual species or other extreme gear or quota

³⁵ Similar closures occur in state coastal waters under the authority of various state laws and interstate compacts as well as internationally under the authority of negotiated conventions and agreements.

reductions. Partial closures, which might limit gear used, amount of fishing effort allowed, or times when fishing is allowed, are also becoming more common.

The effectiveness of fishery controls, as measured by changes in fish populations, like the effectiveness of other MPA controls, has generated controversy among competing community stakeholders. With three requirements in the MSFCMA for (1) recovery schedules for overfished stocks, (2) harvest of U.S. fish at sustainable levels, and (3) minimization of fish, bird, turtle, and marine mammal incidental bycatch, the management of U.S. marine fisheries has become significantly more restrictive since 1996. Some critics of MPAs believe that these changes in the MSFCMA reduce the need for MPAs as a fishery management tool. Other critics believe that the tendency of some fishery interests to oppose marine reserves has been counterproductive, inhibiting cooperation in managing them. Reauthorization of the MSFCMA in the closing hours of the 109th Congress authorized increased attention to protecting deep sea corals as well as additional emphasis on managing marine ecosystems as opposed to individual commercially valued species.

National Wilderness Preservation System (Wilderness Act). This law (16 U.S.C. §1131 *et seq.*) established a system of congressionally designated areas of federal-owned land where many activities are restricted or prohibited to minimize human alterations. Although the extension of this act's authority into marine waters is questioned by those who envision the ocean as common property, marine areas under federal jurisdiction beyond state boundaries but within 200 miles of the coastline could be eligible for designation as "wilderness" by Congress, although none have been designated to date.

Goals of the Wilderness Act are to allow unfettered operation of natural processes and provide for only those human uses, such as primitive recreational activities, that do not affect those processes. The act generally prohibits commercial activities, permanent facilities, and use of motorized equipment or motorboats, landing of aircraft, unless the use had become established before the area was designated. However, Congress may also authorize activities that do not conform with these general prohibitions. For example, the act allows for commercial uses when they are necessary "for realizing the recreational or other wilderness purposes of the area;" the use of motorboats may be authorized where such use is already established, subject to "desirable" restrictions.³⁶

The prospects of establishing "marine wilderness" are being increasingly explored. Some interests who want the strongest possible protections in designated marine areas view this law as creating a model approach to the levels and kinds of protections that should be placed in MPAs, even if the law itself may not be readily transferred to marine areas for other reasons. A portion of these interests believe that the wilderness designation should be a starting point because too many incompatible uses are still allowed. Others counter that wilderness designations are too restrictive. Many of the terrestrial wilderness debates that have taken place center on whether the Wilderness Act's allowances for recreation, boating, or commercial use will be

³⁶ See CRS Report RS22025, *Wilderness Laws: Permitted and Prohibited Uses*, by Ross W. Gorte.

incompatible with protections that proponents seek through a wilderness designation. If this concept is considered for marine areas, similar debates can be anticipated.

National Park Service Organic Act, as Amended. This law (16 U.S.C. §§ 1, 2-4) created the National Park Service (NPS) to administer units of the National Park System, to preserve the lands and resources unimpaired and to foster public use and enjoyment. Each unit has its own management structure; individual laws creating most of the units have placed limits on specified incompatible uses. A total of 39 NPS units in coastal areas have significant marine components.³⁷ Many of these units are in the National Seashore system. Many National Park units permit recreational fishing, and a few even allowed commercial fishing.³⁸ The Park Service's dual mandate of preservation and public use and enjoyment has resulted in conflict between interest groups who debate the desirability of providing greater access and visitor facilities over higher levels of protection.

National Wildlife Refuge Administration Act, as Amended. This law (16 U.S.C. §668dd) establishes the primary purpose of units of the National Wildlife Refuge System to be the conservation of fish and wildlife, and their habitats, and allows other compatible uses if such uses are determined to be consistent with refuge goals. Recreational fishing, hunting, wildlife observation, environmental education and interpretation, and nature photography are priority public uses, and are allowed on many refuges, and oil and gas extraction occurs on a few units. More than 140 refuges are located along the nation's coasts, and some include offshore areas. Some of the most important functions for sanctuaries in marine areas are managing ecosystems and providing habitat for endangered species and migratory birds as well as nursery areas that support key components of coastal and marine ecosystems. However, many regard refuge system jurisdiction as limited in the marine environment.³⁹

Northwest Straits (NS) Marine Conservation Initiative Act. This law (Title IV of P.L. 105-384) established the Northwest Straits Advisory Commission, and authorized the Secretary of Commerce to provide assistance to be used in accordance with the Northwest Straits Citizen's Advisory Commission Report of August 20, 1998. The NS are the waters of northern Puget Sound and southern Georgia Strait in Washington State. The priorities of the Commission are to: (1) collect marine resources data in the NS; (2) coordinate federal, state, and local marine resource protection and restoration activities in the NS; and (3) carry out other activities identified in the Report as important to such protection and restoration. Under this authority, seven county Marine Resource Committees are advising the Commission in its consideration of designating MPAs within the NS.

³⁷ Acadia National Park, Gulf Islands National Seashore, and Buck Island Reef National Monument were among the 39 National Park System units listed in the ongoing federal inventory of U.S. MPAs.

³⁸ In one of these areas, Glacier Bay National Park and Preserve, Alaska, commercial fishing is currently being phased-out.

³⁹ A Department of Justice report of September 15, 2000, by Randolph D. Moss, Assistant Attorney General, concluded: "We are unconvinced, however, that the President would have the authority to establish a national wildlife refuge in either the territorial sea or the EEZ...."

Other Protection Efforts. Many other federal laws affect the quality of the marine environment by regulating coastal and offshore activities. These laws typically set minimum environmental quality standards or protect certain elements of the marine environment rather than designate areas for use or protection. Particularly noteworthy laws in this group include the Endangered Species Act, the Clean Water Act, and the Marine Mammal Protection Act.

Certain offshore areas in federal waters have been protected specifically from oil and gas activities for the past two decades. Starting with the FY1982 Interior Appropriations Act, Congress annually has prohibited these activities in areas that have grown to include waters off New England, the mid-Atlantic states, portions of Alaska and California, the Pacific Northwest, and the eastern Gulf of Mexico. In 1990, President Bush issued a directive limiting OCS activities to federal waters off Texas, Louisiana, Alabama, and portions of Alaska. In 1998, President Clinton extended this moratorium to OCS activities in other areas through 2012. More recently, during its closing days the 109th Congress enacted the Gulf of Mexico Energy Security Act of 2006 (Division C, Title I, of P.L. 109-432), which opens up a portion of the Eastern Gulf of Mexico that had previously been closed.

In addition to the federal laws with authority over MPA designation and management, state and local laws as well as numerous international agreements and conventions may have marine protection components. Some states have been designating areas that have been characterized as MPAs by researchers. Studies of California and Washington published in the late 1990s identify about 100 MPAs in each state. Sites were designated for a wide variety of purposes not only by public entities, such as cities and counties, but also by private entities, such as The Nature Conservancy and various land trusts. A 1997 study concluded that almost 20% of California's state waters were protected in some fashion by a total of 101 MPAs, but that only about 10% of these sites and 10% of the area encompassed in these sites prohibit fishing.⁴⁰ Existing obligations and restrictions under international conventions, such as the Law of the Sea Treaty, affect a coastal state's MPA authority beyond the territorial sea.

MPA activity has been extensive in some other countries. The United States has come somewhat later to this concept than many other nations. The National Research Council document cites a study reporting almost 1,500 MPAs around the world in 1994, with many more sites under study for possible designation. MPAs in other countries may be in such different political, cultural, and/or economic settings that experiences at many of these sites may offer few lessons to the United States. Many of these designated sites, for example, do not prohibit marine harvests. In addition, whatever coordination there might be among sites within a single country is in stark contrast to the general lack of any coordination between countries. Finally, there may be a large gap between how many of the MPAs that seem, on paper, to address the relevant issues, and how they are actually managed in terms of controlling activities or enforcement. MPAs are being designated at an accelerated rate. Canada, for example, announced on March 7, 2003, that it was designating an

⁴⁰ D. McArdle, *California Marine Protected Areas* (La Jolla, CA: California Sea Grant College System, 1997), Publication T-039.

initial MPA to protect some thermal vents along its Pacific coast, and the government is considering 13 additional locations for possible designation.⁴¹

Recent Administrative Actions

The protection of marine resource areas is not a new concept, as can be noted from the various authorities discussed in the previous section. However, what is new is the increasing interest in developing a coordinated, nationwide system of marine protected areas. This interest has been heightened by actions initiated by the Clinton Administration and continued by the Bush Administration. The impetus behind this concept has diffuse roots, and is most evident among scientists and with some non-governmental organizations.

The Clinton Administration. The Clinton Administration responded to growing concerns about marine resource degradation in several ways. It issued Executive Order 13089 on coral reef protection in June 1998 (1998 was also the internationally recognized “Year of the Ocean”). In late 1999 and early 2000, it issued action plans calling for the federal government to work with state, territorial, and nongovernmental partners to expand and strengthen MPAs throughout the United States.⁴² On May 26, 2000, the Clinton Administration issued the Marine Protected Areas Executive Order, E.O. 13158.⁴³ This order called for “strengthening and expanding the Nation’s system of marine protected areas ... throughout the marine environment ... [to] enhance the conservation of our Nation’s natural and cultural marine heritage and the ecologically and economically sustainable use of the marine environment for future generations.”⁴⁴ More specifically, this order:

- aims to increase coordination and effectiveness of MPAs (but did not change existing MPAs nor establish new MPAs);
- directs federal agencies to comply with existing regulations regarding MPAs (but did not alter existing regulations or authorities); and

⁴¹ The monthly newsletter published by the University of Washington, *MPA News: International News and Analysis on Marine Protected Areas*, reports frequently on MPA activities and experiences in other countries.

⁴² The first plan, *Turning to the Sea: America’s Ocean Future*, was prepared by a Cabinet-level task force created at the National Ocean Conference in 1998. It was released September 2, 1999. The second was the *National Action Plan to Preserve Coral Reefs*, prepared by the U.S. Coral Reef Task Force and released on March 2, 2000.

⁴³ The order defines MPAs as “any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.”

⁴⁴ The order also directed the EPA to reduce pollution of beaches, coasts, and oceans by strengthening water quality protection for marine waters.

- charges NOAA and the Department of the Interior to lead federal efforts by (1) creating a list of existing MPAs in the United States;⁴⁵ (2) creating a national MPA webpage about MPAs;⁴⁶ (3) establishing a national MPA Center to provide tools and strategies for promoting MPA effectiveness; (4) establishing an MPA Advisory Committee to provide recommendations from stakeholders outside the federal government;⁴⁷ and (5) consulting with governmental and non-governmental stakeholders.

Finally, on December 4, 2000, it issued E.O. 13178, creating the Northwestern Hawaiian Islands (NWHI) Coral Reef Ecosystem Reserve. This reserve, encompassing about 120,000 square miles (about 77 million acres), is the largest protected area ever established in the United States. Within the overall reserve, 15 Reserve Preservation Areas encompassing about 6,200 square miles (nearly 4 million acres, or about 5% of the reserve) were designated where all consumptive or extractive activities are limited. NOAA manages the Reserve under the authority of the NMSA.

The Bush Administration. The Bush Administration has generally continued the initiatives started by the Clinton Administration, and has expanded on them in some cases. On June 4, 2001, after a review, Secretary of Commerce Donald L. Evans of the Bush Administration cabinet announced the retention of E.O. 13158 about marine protected areas. The Administration announced that it had selected 30 members for the MPA Advisory Committee on January 3, 2003. They represent all the marine regions, including the Great Lakes and the United States territories, and a wide range of expertise, including resource management, science, policy, and marine industries. The committee has met periodically since the summer of 2003.

MPA Center Activities. The MPA Center, created by E.O. 13158, was established at NOAA headquarters in suburban Washington to coordinate many federal activities and interests in this topic. The MPA Center is supported by two institutes: the Institute for MPA Science, whose creation at a new federal fishery research facility in Santa Cruz, California, was announced by then Secretary of Commerce Norman Mineta on October 18, 2000; and the Institute for MPA Training and Technical Assistance in Charleston, South Carolina, announced by NOAA in early January 2001. On September 26, 2006, the Center released a draft framework containing a set of recommendations for developing a national system of MPAs. The framework, developed after numerous workshops and meetings, proposes guiding principles, goals and objectives, and definitions for a national system. The comment

⁴⁵ The Administration's inventory of existing U.S. MPAs can be found on the website at [http://www.mpa.gov/mpaservices/mpa_inventory.html], July 1, 2003.

⁴⁶ Detailed information on current Administrative actions can be obtained from the MPA website at [<http://www.mpa.gov>], July 1, 2003.

⁴⁷ A request for nominations was published at 65 *Fed. Reg.* 50503 (Aug. 18, 2000).

period for the draft framework closed February 28, 2007, and publication of the final document is scheduled for late 2007 or early 2008.⁴⁸

Another major activity at the Center has been creating a list of MPAs by identifying existing federal, state, local, and tribal protected sites that meet the order's definition of an MPA. The current inventory effort is compiling a list of marine managed areas by 2004, from which it can then develop a list of MPAs. As it undertakes this effort, the Center is developing definitions and criteria so there will be consistency among the designations. Three purposes of this inventory are to provide information that can be used in environmental assessments; to lay a foundation for objective analysis in designing a national MPA system; and to provide a centralized source of information that can be used to help protect the resources within every MPA. The information gathered through this inventory will be available to federal, state, local, and tribal governments, who can use it to enhance or strengthen protections to fulfill regional conservation goals. On January 25, 2005, NOAA issued a notice detailing the final criteria and data fields that will be used in building the inventory.⁴⁹

Other initiatives of the Center include an education project to increase knowledge and awareness about MPAs. It provides educators with materials about topics that are relevant to MPAs, such as marine habitats and fisheries, through a website and workshops. It holds workshops and other events to inform the public about MPAs. It is also leading a multi-year pilot program in California, Oregon, and Washington to try to improve approaches for designing and managing a system of MPAs at a regional level.

Other Recent Federal Agency Actions. While the Center has coordinated many aspects of the federal interest in MPAs, other federal government agencies have been active in recognizing MPAs. The examples below indicate the breadth of resources being protected and actions taken in recent years.

- The EPA Administrator signed a proposed rule on January 19, 2001, that would establish Special Ocean Sites to protect outstanding values of (1) Flower Garden Banks off Texas, (2) Golda Ridge-Blanco Fracture Zone off Oregon, (3) Escanaba Trough off California, and (4) Northern Right Whale Critical Habitats off the Atlantic coast.
- Regional Fishery Management Councils and the NOAA Fisheries established six areas on George's Bank and adjacent areas off New England where all fishing is prohibited to foster groundfish recovery.
- In March 2002, NOAA took additional steps to protect the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve by (1) initiating the process for designating the Reserve as a National Marine Sanctuary; (2) issuing a draft Reserve Operations Plan for public comment; (3) releasing the Western Pacific Fishery

⁴⁸ National Marine Protected Areas Center, *Draft Framework for Developing the National System of Marine Protected Areas*, July 2006, 78 pp.

⁴⁹ 70 *Fed. Reg.* p. 3512-3521 (Jan. 25, 2005).

Management Council's Coral Reef Ecosystem Fishery Management Plan for public comment; and (4) releasing a final rule concerning the harvest of precious corals.

- The North Pacific Fishery Management Council has designated a marine reserve in Southeast Alaska,⁵⁰ an Aleutian Islands Habitat Conservation Area, Aleutian Islands Coral Habitat Protection Areas, Alaska Seamount Habitat Protection Areas, a Bowers Ridge Habitat Conservation Zone, Gulf of Alaska Coral Habitat Protection Areas, and Gulf of Alaska Slope Habitat Conservation Areas.⁵¹
- The Channel Islands National Marine Sanctuary and the Florida Keys National Marine Sanctuary have been coordinating the public process of designating portions of the sanctuaries as fishery no-take zones.
- Extensive stakeholder participation highlighted the establishment of two marine reserves near the Dry Tortugas National Park with collaboration among the Florida Keys National Marine Sanctuary, the National Park Service, and the State of Florida.

States have also been active in the field of MPAs, with perhaps California being the most active. California authorities have been working to reach consensus on a comprehensive program of MPAs in state coastal waters under the 1999 Marine Life Protection Act (Assembly Bill 993), as well as on a network of marine reserves around the Channel Islands under discussion by a Marine Reserves Working Group. In April 2007, the California Department of Fish and Game adopted regulations to establish 29 marine reserves along the central California coast from Pigeon Point in San Mateo County to Point Conception in Santa Barbara County. The reserves include 204 square miles or approximately 18% of state waters with 85 square miles designated as no-take marine reserves. Recreational and commercial fishing interests opposed the proposal because of the reduced harvest opportunities it will impose, while environmental interests view this as a good start to more extensive protection in the future. Other states have also taken action. For example, Hawaii enacted legislation (Act 306 in 1998) to establish a network of marine aquarium reserves along the Kona-Kohala coast of the Island of Hawaii.

Issues for Congressional Consideration

The 110th Congress is likely to discuss MPAs both indirectly and directly. The indirect references will occur as Congress discusses specific topics, such as coastal management or marine mammal protection in which MPAs might play a role. More direct discussions of how the MPA concept might be applied, either alone or in the context of the existing programs that already protect marine resources, also seem likely. This topic may receive much more attention if Congress draws from reports and recommendations from the Pew Oceans Commission in 2003 and the U.S. Commission on Ocean Policy in 2004.

⁵⁰ 65 *Fed. Reg.* 67305 (Nov. 9, 2000).

⁵¹ 71 *Fed. Reg.* 36694 (June 28, 2006).

These reports, as well as the 2001 report from the National Research Council, view the current piecemeal approach of dealing with marine resource needs and management options as contributing to the decline in marine environmental health. Many supporters of the MPA concept draw from these reports as they encourage Congress to replace the current approach with a more systematic and coordinated response. Many of these supporters have endorsed the Pew Oceans Commission and U.S. Commission on Ocean Policy recommendations as a starting place for policy discussions.

The 2001 NRC report on MPAs did not make a recommendation about whether additional legislation might be desirable or whether a new law addressing this topic is needed, although it did recognize the fragmented nature of the current effort. It did discuss the costs and benefits of MPAs in comparison to more conventional management tools, explored the feasibility of implementation, and assessed the scientific basis and adequacy of techniques for the design of MPAs and marine reserves. Among its conclusions were that MPAs can be most successful if:

- all stakeholders are enlisted to participate in developing management plans;
- effective planning and design are provided; and
- integral components include regular monitoring, assessment, enforcement, and community education.

The NRC report endorsed using marine reserves as resource and fishery management tools in combination with traditional management measures. It asserted that federal and state agencies need to provide resources, expertise, and coordination for integrating individual MPAs into the framework for coastal and marine resource management to meet the goals established at state, regional, national, or international levels.

The Pew Commission report does call for legislation. In the report, released in June 2003, the Commission provides a major overview of marine policy, which it characterized as “the first comprehensive review of U.S. ocean policy in more than 30 years.” While this claim is subject to challenge, it is certainly among the most comprehensive studies in recent decades. The commission calls for a system of marine reserves to be established. It recommends a context for ocean management based on restoring and maintaining healthy marine ecosystems within which marine reserves would be critical elements. Other recommendations, while not mentioning reserves directly, suggest that they would be part of a broad marine management effort that would also center on ocean zoning and on establishing both regional ocean ecosystem councils and a new independent federal ocean agency.

The Pew Commission viewed reserves as sites that would transcend federal-state boundaries. It calls on Congress to enact a mandate to establish such a system and provide the necessary institutional structure and legal authorities to implement it. It also states that federal agencies should use existing authorities to establish reserves within areas that have already been designated for protection until such a mandate is enacted. In numerous recommendations about fisheries management, reserves are rarely mentioned, although the notion of zoning the ocean to segment use

areas appears at several places, drawing on a background report on marine reserves, mentioned above.

The report from the U.S. Commission on Ocean Policy may have the greatest impact on congressional considerations, since Congress created this commission in legislation and it reported to Congress and the Administration. The commission's recommendations are limited to a single indirect reference in the fisheries chapter to pursue an ecosystem approach to identify and designate "essential fish habitat" that uses current efforts to "identify important habitats and locate optimum-sized areas," and a more explicit recommendation in the chapter that discusses coordinated management in federal waters calling for a uniform process to designate, design, and monitor MPAs.⁵² If Congress considers MPA-related legislation, it may raise many questions about the concept and how it might be applied. Some of these questions are identified below.

Congress could decide to respond to these recommendations by amending any of these laws discussed above. However, changes to promote more comprehensive protection could hamper ongoing activities under them and lead to legal challenges. The diversity of these laws and the fractured administrative responsibilities (including regulatory and implementation authorities) result in fragmented components rather than an integrated system to manage complex marine ecosystems. In the federal community, the Departments of Agriculture, Commerce, Defense, and the Interior all protect areas for diverse purposes; even the U.S. Forest Service plays a major role in some areas along the Pacific coast.

A central component of any congressional consideration is likely to pit economic interests, who oppose MPAs because designation would place limits on the use or extraction of ocean resources, against environmental and research interests, who would like to see more widespread or systematic protection of ocean resources, especially living resources that are either scarce or threatened. MPA advocates favor primacy for sustainable resource protection over revenue-generating activities, and believe that quick congressional action is needed to prevent further destruction or deterioration, while opponents say the benefits of such designations are far from proven.

If Congress decides that current laws and programs are insufficient to conserve coastal and marine resources, it must then determine what new or changed laws are needed to protect additional places or to provide more consistent protection. If it decides that MPAs can play a role in an expanded effort, it would then need to determine whether marine resource protection efforts will be better served through a comprehensive statute on MPAs that provides a systematic approach rather than amendments to the current mix of existing authorities and unit-by-unit designations. In examining this question, it might look to the work of the U.S. Commission on Ocean Policy. Part of such an examination could center on whether the strength of statutory language to provide a legislative mandate is needed in place of the executive order on MPAs issued by the Clinton Administration.

⁵² Recommendations 19-21 and 6-3, respectively.

As Congress examines the adequacy of existing authorities that are viewed by some as options to new MPA legislation, it may try to determine if these laws adequately recognize the interests of stakeholders and provide a forum for resolving conflicts among them. It may review the activities of NOAA's MPA Center as a possible model for such a forum. The NRC report notes the importance of engaging all stakeholders in crafting management plans for MPAs. Both the National Marine Sanctuaries Act and the Magnuson-Stevens Fishery Conservation and Management Act require extensive public participation as well as thorough environmental, social, and economic analyses prior to closing areas to specified activities.

Proponents of increased public participation may point to the Northwest Hawaiian Reserve, created by a Clinton Administration executive order and mentioned above, as an example where the time available to receive public input on use restrictions was insufficient. In that instance, elements of the commercial fishing industry, in particular, who had used large portions of the area that was placed within this new reserve, claimed that they were not involved in deciding what areas should exclude fishing. The Clinton Administration claimed, however, to have sought to involve many interests in the planning process, noting that more than 430 stakeholders attended public meetings and more than 1,000 written comments were received on this reserve proposal. In addition, it created an advisory panel of community stakeholders to guide the planning for and implementation of this reserve. Since stakeholder involvement can be crucial, any legislation may need to include provisions clarifying acceptable levels of participation. The Bush Administration seems to have reached a similar conclusion about support for the Northwest Hawaiian designation, when it expanded its size and re-designated it as a national monument.

Congress may take many recent experiences of marine deterioration into account as it considers whether and how to respond to the recommendations of the U.S. Commission on Ocean Policy, as well as the growing number of analyses of the MPA approach. Drafting new MPA legislation, that tries to accommodate all the various reasons MPA advocates put forth for protection and includes a framework under which these reasons can be weighed against each other, would be challenging. If MPA legislation were enacted, other laws may need to be modified or repealed for greater consistency.

Any new legislation might also address whether all currently protected marine areas should be automatically moved into a new MPA system as an additional form of protection, or whether any proposed MPA system should replace only some of those protections and designations. It also might have to address more specific questions, such as how to deal with sites that lie in both federal and state waters. In these situations, legislation might include incentives to states to take complementary actions to protect marine resources. Other considerations might include the costs of an MPA program, how to monitor the effectiveness of an MPA programs, and how various marine users might be affected by an MPA program.