

Bradley W. Barr
James Lindholm

Conservation of the Sea Using Lessons from the Land

Introduction

The protection of natural areas valued by society is a tradition dating back to the earliest human settlements and extending across cultural boundaries (Henneberger 1998). Protected area design for the conservation of biological diversity and the protection of endangered species is a well-established tenet of modern conservation biology (see Primack 1993), and the use of protected areas for the management of natural resources (such as forests and fish) is increasingly popular in management communities. Modern protected areas in the USA encompass topography as diverse as the Alaskan tundra (NPS 1997), the Florida Everglades (USFWS 1998), and the Grand Canyon (NPS 1997). The modern rationale for protection is equally diverse, ranging from tribute to historical personages, to protection of endangered species, to the preservation of natural areas (NPS 1997).

Considered *in toto*, the panoply of modern protected areas in the USA is an impressive representation of what we value, or at least what we seek to value. However, there is a wide disparity between the total area of land and ocean under federal protective management (Brailovskaya 1998; Lindholm and Barr, in review). Of the total U.S. landmass (more than 9 million sq km including Alaska and all territories), approximately 18% is included in some form of protected area (Lindholm and Barr, in review). In contrast, the total area of U.S. waters within the 200-mile Exclusive Economic Zone, or EEZ (including all state and territorial waters), is approximately 46 mil-

lion sq km (Watson and Griffis 1998). Of this, a scant 0.1% is currently under federal protection (Lindholm and Barr, in review).

This disparity may be a function of time and accessibility. The oceans have until recently been widely considered to be vast and limitless and efforts to preserve them are a recent phenomenon. Terrestrial areas are more readily accessible to the public, and it is quite understandable that the beauty and grandeur of the Grand Canyon would be valued and protected years before someplace such as the Monterey Canyon. As a geologic formation, this submarine feature of the California continental shelf and slope may be even more

spectacular than its land-based counterparts, but its visual beauty and prolific resources are hidden in darkness, only to be seen in the lights of a submersible or remotely operated vehicle. The disparity may also rise from the vast differences in program budgets, with comparatively little funding being directed to marine protected area designation and management in the federal budget. And it may also be a result of considerable uncertainty over just what we want to accomplish with federal marine protected area programs. In this paper we discuss the many shared characteristics of the agencies charged with protecting land and water in the USA, and offer suggestions as to how experience in designating and managing public lands can inform the process of protecting the marine environment.

Protection of the Land

The development of terrestrial federal public land management has resulted in a "toolbox" with a variety of tools for different tasks (such as the National Park, National Forest, National Wildlife Refuge, and National Wilderness Preservation systems). Having multiple options for management does not in itself guarantee an effective system of protected areas, for the obvious reason that competition among programs for funding and visibility can get in the way. However, having a variety of options can make the job of fitting the right authority to the goals of protected areas designation some-

what more straightforward.

The spectrum of federal public lands management programs starts with the Bureau of Land Management (BLM), which has some conservation goals but is more focused on making sure the public's interests are served in the use of lands under their authority. Operating principally under the authority of the Federal Land Policy and Management Act of 1976 (43 USC 1701), BLM is charged with "the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs for the American people...." Next in line is the U.S. Forest Service (USFS). Deriving its authority from the National Forest Management Act of 1976 (16 USC 1600 {note}), USFS establishes conservation goals for the National Forest System, though it pursues these goals through the pursuit of sustainable, multiple-use management, as opposed to any overarching emphasis on preservation. This is the most protective sort of designation that might routinely permit and perhaps even encourage sustainable commercial extractive use of these areas.

Toward the other end of the conservation spectrum are the national wildlife refuges and the national parks, monuments, and preserves, which are designated to preserve areas for their natural values, while allowing the public to use these areas for compatible recreational uses. While commercial extractive uses

generally are not permitted, a broad range of recreational activities are allowed (although strictly managed) consistent with the National Park Service (NPS) and U.S. Fish and Wildlife Service (USFWS) mandates to preserve these areas (see National Park Service Organic Act {16 USC 1} and the National Wildlife Refuge System Administration Act {16 USC 668dd}).

Finally, there is the National Wilderness Preservation System (NWPS), which is used to preserve the most valued wild areas on BLM lands and in national parks, forests, and wildlife refuges. The goal here is entirely focused on preservation of the attributes that make that area "wilderness" as established under the Wilderness Act of 1964 (P.L. 88-557, 78 Stat. 890, 16 USC 1121(note), 1131-1136). There are 625 units in the NWPS, totaling some 423,185 sq km of public land administered by each of the four terrestrial protected areas agencies mentioned above (NWPS 1999). According to the Wilderness Act, wilderness is "where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain." Under the NWPS, wilderness areas are designated by the U.S. Congress, and since the passage of the original act in 1964, sixty-four designations have been made (NWPS 1999). While there is some variety in how each of these agencies manage wilderness areas under their authority, the diversity of programs provides a

greater opportunity to find a "best fit" with the goals and objectives underlying the designation. At its center, however, is the clear mandate to preserve a legacy of wild public lands for this generation and into the future.

Protection of the Sea

The management of publicly owned waters and seabed areas is, in practice if not in theory, quite different from that of public lands. Unlike the terrestrial realm, where public lands are but a small portion of the largely privately owned landmass of the USA, all the waters of the EEZ (with a very few riparian exceptions) are owned in common by the people. As established through common law, and long supported in American case law, the state and federal governments hold these waters in trust for the public. In addition, the courts have held that these government stewards also have a duty to protect and preserve the public's interest in natural wildlife resources (Britton 1997). Notwithstanding this well-established principle of common ownership of the EEZ, some users have a strong perception of a special standing, and a few even believe that they actually own the resources and have a greater right to them because of some long-standing tradition of use, or a familial legacy. The public, in most areas of the country, have not expressed their concerns about the use and allocation of natural resources in these publicly owned waters, and as a consequence much of

the stewardship and management of these ocean areas is strongly influenced by those who have the greatest economic stake in management decision-making. Clearly, the varied perceptions of resource ownership among managers, users, and members of the public have very significant implications for the preservation and management of marine protected areas.

Until recently, the approach to management of marine resources was minimalist, owing in large part to the perception of the oceans as “vast and limitless”—a perception that has perhaps been contributed to by the apparent hesitancy of ocean and coastal managers to embrace a “public waters” management perspective like that of their counterparts on land. The resulting governance of these public waters has been largely regional in scope, targeted to individual activities or resources, and involving extensive participation in management from users, but little from the general public, in whose interest the resources are supposed to be managed.

In the past few years, there has been more interagency coordination, but there is much resistance to it by some resource managers who see the need to coordinate as confounding the process rather than making it more effective and efficient. It is therefore not at all surprising that so few marine protected areas have been designated compared with land-based conservation and preservation efforts (Lindholm and Barr, in re-

view).

Toward a New Paradigm

A system for effective management of marine resources and preservation of marine wilderness areas calls for a public waters perspective equivalent to public lands stewardship of terrestrial protected areas. If we envision such a system, the first level of management would be regional authorities focusing on individual activities or resources, something with a similar level of authority to that of the BLM. One example of these regional management programs is the National Marine Fisheries Service’s implementation of the Sustainable Fisheries Act (SFA; officially titled the Magnuson-Stevens Fisheries Conservation and Management Act, P.L. 104-297). This law focuses on managing the commercial and recreational exploitation of particular species of fish and shellfish. As a part of the implementation of SFA, seasonal and area closures may be established that target a single species or species assemblage. Such closures have been shown to influence non-target species and taxa (Collie et al. 1997). However, only recently has habitat protection become a part of a nationwide management effort under SFA through the identification and management of essential fish habitat. The SFA has a limited context, largely focusing on the relationship of essential fish habitat to sustainable exploitation of the target species or species complex. Even in area-based manage-

ment under SFA, the law's ability to address other uses not associated with fishing may be quite limited. For example, while the use of mobile fishing gear may be prohibited in such fragile habitats as coral reefs, the authority to prohibit other damaging activities (e.g., anchoring of vessels not engaged in regulated fishing activity) is missing from the SFA. While there have been attempts to broaden the scope of management under SFA to embrace ecosystem concepts, such a change in its single-species approach is not likely to happen quickly.

Another law which has resulted in limited area-based management of marine waters is the Endangered Species Act (ESA; 16 USC 1531). Under this law, certain areas can be set aside as critical habitats for listed species. Only a small number of critical habitats have been designated for marine species, and only a very few of these are in offshore marine areas. One example is the critical habitat designations in the Great South Channel (located between Georges Bank and Cape Cod, off the coast of New England) and Cape Cod Bay for northern right whales. Like the SFA, whatever management that does occur in these areas is limited to this single (in this case, listed) species and its habitat. The authority to manage human activities in these right whale critical habitats is potentially broad, but the designations in this example brought no new restrictions or protections (Barr 1997).

The SFA and ESA, as well as

other federal laws such as the Clean Water Act (33 USC 1251), the Oil Pollution Act of 1990 (33 USC 2701), the Migratory Bird Treaty Act (16 USC 703), and a host of others, provide the basis for ocean management akin to the role BLM plays in the public lands matrix. These laws were established to manage, conserve, and preserve marine areas and resources from specific human activities that occur in public waters. Like the authority of the BLM, the mission of these laws is to ensure that public waters are used appropriately. Extractive uses are managed so that the public interest is served. While more communication and coordination would be helpful—and considerable attention is being paid to the implementation of integrated coastal management both in the USA and around the globe—these programs provide the basic resource management for the EEZ.

The next level of public waters stewardship, roughly comparable with the National Forest System, is the National Marine Sanctuary Program, which is under the authority of the National Oceanic and Atmospheric Administration (NOAA). The National Marine Sanctuary Act (16 USC 1431) provides the authority to identify "areas of special national significance" and establishes "comprehensive and coordinated conservation and management" for these discrete areas of the marine environment in all U.S. waters out to the 200-mile EEZ limit (including state waters). The mandate of the program

is to “facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these areas” not otherwise prohibited by other authorities. These areas are clearly focused on multiple-use management, permitting for-profit extractive uses, such as commercial fishing, in many of the sites (Barr 1995), and providing “comprehensive and coordinated conservation and management” in large part through the authorities of other agencies by helping them make decisions that will preserve the resources and those qualities that make them “nationally significant.”

In the past few years, the National Marine Sanctuary Program has begun to move toward seeking greater preservation of marine biodiversity in critical habitat areas within and adjacent to the sanctuaries. It has been particularly successful with initiatives in the Florida Keys National Marine Sanctuary, such as the designation of the Western Sambo Ecological Reserve and 18 sanctuary preservation areas (U.S. Department of Commerce 1996). The National Marine Sanctuary Program is also involved in a multi-agency effort to look at the establishment of marine reserves at the Channel Islands National Marine Sanctuary, and another large ecological reserve in the Dry Tortugas within the Florida Keys National Marine Sanctuary.

As national marine sanctuaries are principally focused on multiple-use management, efforts to establish a

higher level of protection and preservation are generally hard-won. They have required considerable time and effort, through consensus-based multi-stakeholder planning processes, to gain the support of commercial and recreational users of the areas to be preserved. Only a small fraction of the area of the U.S. EEZ that has been designated as national marine sanctuaries can be characterized as fully protected as marine reserves (Agardy 1999; Lindholm and Barr, in review). Agardy (1999) concludes that the total area protected by national marine sanctuary designation is “too small to promote conservation of marine ecosystems” because “sanctuaries cater to commercial and recreational needs and have no teeth whatsoever for providing the necessary controls on damage.” There has also been some general concern raised recently (MPA News 1999; Wuerthner 1999) that such multi-stakeholder processes may, through too much compromise and by vesting considerable power in local user groups to influence the outcomes of the process, result in inadequate protection for critical resources and habitats. While multiple-use management of marine areas that allow commercial and recreational extractive use may be an effective tool to protect and conserve resources in areas that are ecologically robust and resilient, areas that are more fragile and subject to damage from individual or collective human uses may require authorities that more directly embrace preservation.

There are 51 units of the National Park System that manage marine resources within their boundaries (Ficker 1999; Davis 1999). Under our proposed system, the NPS would fill a similar role in the ocean as it does on land. Some examples of national parks, monuments, and preserves that include large areas of the marine environment are: Glacier Bay National Park and Preserve (2,434 sq km), Biscayne National Park (665 sq km), Everglades National Park (2,072 sq km), and Channel Islands National Park (roughly 500 sq km). NPS has also focused special attention on preserving ocean areas that include coral reefs. In the National Park System there are nine coral reef areas, totaling 994 sq km, located in that Atlantic-Caribbean and Pacific regions. While NPS manages no areas that are entirely ocean, its authority to manage and designate ocean areas already seems to be in place—perhaps only some explicit references to protecting marine wildlife need to be appended to the NPS Organic Act (Ficker 1999). The Canadians have a similar program, designating what are called “marine conservation areas,” under the authority of Parks Canada.

Finally, there is the issue of designating and protecting marine wilderness—perhaps the most difficult, but most critical, task at hand. Davis (1998; 1999) has made a strong and eloquent case for protecting marine wilderness. The Clinton Administration also has advocated for marine wilderness designations in its

Ocean Initiative (U.S. Department of Commerce 1999). The issue, therefore, is not whether this is a good idea, but how to get the job done. A possible answer is to formally extend the NWPS into the ocean, as suggested by Brailovskya (1998). This would require some changes to the Wilderness Act to reference NOAA (as stewards of the National Marine Sanctuary Program and managers of fisheries under the SFA and ESA) and to add explicit references to preservation of marine wilderness. A first step has already been taken in Alaska, with the designation in Glacier Bay National Park and Preserve of 215 sq km of marine wilderness under the authority of the NWPS. While these pioneering initiatives in Glacier Bay have been extremely controversial, NPS has been able to use its exceptionally strong public constituency to fend off opposition.

While the most recent Congresses seem to be disinclined to designate much wilderness under the NWPS (only one site since 1995), and some critics have expressed concern about the existing implementation on land, designations under NWPS might benefit broadly from adding the current public constituency for marine preservation to the chorus already advocating for wilderness on land. While the public has been slow to rally to support of MPAs, education and outreach programs related to marine environmental issues (such as those of the Marine Conservation Biology Institute, Center for Marine Conservation, and SeaWeb, for ex-

ample) are working hard to improve this.

There is yet another benefit to using NWPS authority to protect marine wilderness. Because wilderness can be designated using any of the existing authorities, there is little cause for anything other than friendly competition for resources and visibility among marine protected area programs. Like the land-based efforts of NPS, USFS, and USFWS, each marine protected area authority will implement the NWPS in a manner consistent with its mission, vision, and program strengths. For the National Marine Sanctuary Program, adding the NWPS mandate might provide a more appropriate authority to protect and preserve wilderness areas within sanctuary boundaries. For NPS, it would provide park managers with the opportunity to wade into the water deeper than their knees.

Conclusion

Through a more effective and creative use of some existing tools, and minor modification of others, the toolbox available to protect—and especially to preserve—the USA's marine resources would be expanded significantly under the scenario proposed. No longer would everything look like a nail simply because the only tool available was a hammer.

There is no doubt that land and water are different. Some of the challenges faced by public lands managers would be wholly unfamiliar to those who manage marine protected areas. However, there are clearly more similarities than differences, and the opportunity to share experience and expertise could be the tide that lifts all boats. It can help expand what has been called "America's best idea" from the public lands into our public waters.

Acknowledgments

The work of James Lindholm was supported in part by the Mudge Foundation. The views expressed herein are those of the authors and do not necessarily reflect the views of the Department of Commerce, NOAA, or any of its sub-agencies.

References

- Agardy, T. 1999. Creating havens for marine life. *Issues in Science and Technology* 99, 37-44.
- Barr, B. W. 1995. The U.S. National Marine Sanctuary Program and its role in preserving sustainable fisheries. Pp. 165-173 in *Marine Protected Areas and Sustainable Fisheries*. N. L. Shackell and J. H. M. Willison, eds. Wolfville, N.S.: Science and Management of Protected Areas Association.
- . 1997. Mariculture in offshore critical habitat: A case study of the Stellwagen Bank National Marine Sanctuary. *Coastal and Ocean Law Journal* 2(2), 273-287.
- Brailovskaya, T. 1998. Obstacles to protecting marine biodiversity through marine wilderness preservation: Examples from the New England region. *Conservation Biology* 12, 1236-1240.

- Britton, D. F. 1997. The privatization of the American fishery: Limitations, recognitions, and the public trust. *Ocean and Coastal Law Journal* 3, 217-257.
- Collie, J. S., G. A. Escanero, and P. C. Valentine. 1997. Effects of bottom fishing on the benthic megafauna of Georges Bank. *Marine Ecology Progress Series* 155, 159-172.
- Davis, G. 1998. What good is marine wilderness? Pp. 133-137 in *Linking Protected Areas with Working Landscapes Conserving Biodiversity*. N. W. P. Munro and J. H. M. Willison, eds. Wolfville, N. S.: Science and Management of Protected Areas Association.
- . 1999. Why don't parks and sanctuaries protect marine fish too? *The George Wright Forum* 16, 88-96.
- Ficker, J. D. 1999. A policy analysis: Can the national park concept be effectively extended to the marine environment? Paper presented at the 10th Conference on Research and Resource Management on Public Lands, 22-26 March, Asheville, N.C.
- USFS [U.S. Forest Service]. 1998. *Land Areas of the National Forest System as of September 1997*. Washington, D.C.: U.S. Department of Agriculture.
- Henneberger, J. W. 1998. On the origin of protected areas. Pp. 833-840 in *Linking Protected Areas with Working Landscapes Conserving Biodiversity*. N. W. P. Munro and J. H. M. Willison, eds. Wolfville, N. S.: Science and Management of Protected Areas Association.
- Lindholm, J., and B. Barr. In review. Comparison of marine and terrestrial protected areas under federal jurisdiction in the United States. Submitted to *Conservation Biology*.
- MPA News. 1999. When are consensus processes appropriate for MPA management? *MPA News* 1: 4, 6.
- NPS [National Park Service]. 1997. *The National Parks Index 1997-1999*. Washington, D.C.: NPS.
- . 1998. The National Park Service Organic Act, 16 U.S.C. 1 ff.
- NWPS [National Wilderness Preservation System]. 1999. Web site: <http://www.wilderness.net/nwps/>.
- Primack, R. 1993. *Essentials of Conservation Biology*. Sunderland, Mass.: Sinauer.
- U.S. Department of Commerce. 1996. *Florida Keys National Marine Sanctuary: Final Management Plan/Environmental Impact Statement Volume I*. Washington, D.C.: U.S. Department of Commerce.
- . 1999. *Turning to the Sea: America's Ocean Future*. Washington, D.C.: U.S. Department of Commerce.
- USFWS [U.S. Fish and Wildlife Service]. 1998. *Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service as of September 30, 1997*. Washington, D.C.: USFWS.
- Watson, L. M., and R. B. Griffis. 1998. A *Nation-wide Inventory of Coastal and Marine Protected Areas in the United States*. Washington, D.C.: U.S. Department of Commerce, Washington, D.C.
- Wuerthner, G. 2000. Selfish genes, local control, and conservation. *Wild Earth* 9:4, 87-91.

Bradley W. Barr, NOAA National Marine Sanctuary System, c/o U.S. Geological Survey, 384 Woods Hole Road, Woods Hole, Massachusetts 02543; Brad.Barr@noaa.gov

James Lindholm, National Undersea Research Center, University of Connecticut at Avery Point, 1084 Shennecossett Road, Groton, Connecticut 06340-6097; lindholm@uconnvm.uconn.edu



