

Marine Reserves

A Guide to Science,
Design, and Use

Jack Sobel and Craig Dahlgren



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Marine Reserves

Preface

My own first exposure to marine reserves came in the mid-1980s. As a neophyte graduate student, I was directing a research project in the town of San Pedro, on Ambergris Caye, Belize, and got entrained in the development of a local marine reserve there, which eventually became the country's first, the Hol Chan Marine Reserve (see chapter 10). Though the local community, the reserve itself, and my role in its development were relatively small; the exciting process leading to its creation, the community dynamics surrounding it, and its successful outcome provided me with a great appreciation for the conservation potential of marine reserves, the challenges of establishing them, and the approaches needed to overcome these challenges. The basic tenets of strong science and design, good public process, active community involvement, and careful development of public and governmental support that I first learned there I have repeatedly seen as essential to successful reserve development across a diversity of settings, both firsthand and via reports from others. These underpinnings are reflected throughout this book.

My professional interests and career have long balanced on the cusp between marine science and policy. In 1988, after returning stateside from Belize, I took a marine policy fellowship and served as a staff member to the U.S. Senate's National Ocean Policy Study. Among my principal responsibilities in this position was staffing the reauthorization of the National Marine Sanctuary Act (NMSA). Like most Americans, I was previously unaware of the existence of the small National Marine Sanctuary Program (NMSP), one of the country's best kept secrets, buried deep within the Department of Commerce's National

Oceanic and Atmospheric Administration. Yet, I was excited and intrigued by the potential of this program to protect special ocean places. The successful reauthorization of the NMSA late in 1988 coincided with the approaching end of my Senate fellowship. As I looked to build on my experiences, I sought a position that would include the pursuit of highly protected ocean places and the possibility of unlocking the potential of the NMSP to create them.

Early in 1989, I accepted such a position with the Center for Marine Conversation (CMC, now The Ocean Conservancy) based on its reputation for sound science, policy expertise, and integrity and my experience with it as an outstanding source of information on marine sanctuaries, marine protected areas, and a host of other issues to me in my Senate position. From 1989–1994, I directed the organization's habitat, marine protected area, and ecosystem protection work, including major efforts to expand and strengthen the NMSP. These efforts were highly collaborative and phenomenally successful by many measures, including a doubling in the number of sanctuaries, a five-fold increase in sanctuary area, and a similar increase in funding for the program. They also reinvigorated the sanctuary program with improved public support, greater public recognition, and committed activists and supportive coalitions for many individual sites. Despite these successes, it remained clear that existing sanctuaries lacked comprehensive protection and any significant protection from fishing activities, and that only one site afforded short-term prospects for providing either.

From 1990–1995, the still new and budding Florida Keys National Marine Sanctuary (FKNMS) offered the only real opportunity to significantly address fishing impacts within the sanctuary system and among the best opportunities to develop marine reserve level protection within continental U.S. waters. The FKNMS emerged from the collaborative efforts to expand and strengthen the NMSP described above and was uniquely created via an act of Congress. Enacted in 1990, The Florida Keys National Marine Sanctuary and Protection Act (FKNMS&PA) created the nearly 3,000 nautical mile² sanctuary, provided a strong mandate for its protection, and established a framework for its management. The Act required the subsequent development of a comprehensive management plan for the area rather than providing one, but explicitly required consideration of geographical zoning (e.g., marine reserves) to protect its resources. By 1995, it was clear that successful implementation of marine reserves within the FKNMS was far from a done deal and would require substantial and expanded efforts and improved arguments and information regarding the efficacy and experience with marine reserves elsewhere. In recognition of this, I focused my efforts more fully on the marine reserve issue and initiated research

on the global experience with marine reserves that eventually led to the development of this book.

In 1995, I organized an international workshop on the Global Experience and Efficacy of Marine Reserves, cosponsored by CMC and the Caribbean Marine Research Center (CMRC), and held at CMRC's Lee Stocking Island Field Station in the Bahamas. The workshop brought together leading marine reserve experts from around the globe with firsthand experience in the development and evaluation of marine reserves and included participants from six continents. This provided a wealth of information and diversity of perspectives on marine reserves, identified both commonalities and differences related to marine reserve development in different environments, and produced one of the first consensus statements on the benefits of marine reserves (see chapter 4). Many of the roots of this book can be traced back to this workshop and subsequent research, contacts, and experiences that grew out of it. The workshop, follow-up activities, and related research greatly expanded my horizons with respect to marine reserves and also contributed to the successful implementation of a limited system of marine reserves in the FKNMS in 1998, a much larger marine reserve off of Florida's Dry Tortugas, also within the FKNMS, in 2002, and a more extensive network of marine reserves in the Channel Islands NMS off California in 2003 (see chapter 8).

Initial plans to publish proceedings from the 1995 workshop were delayed and then cancelled due to rapidly evolving marine reserve developments and other related priorities. In less than a decade since that workshop, the number and size of marine reserves, the research related to them, and the evidence supporting their efficacy have all continued to expand dramatically. In the United States, development of marine reserves off the Florida Keys, including the larger Tortugas Ecological Reserve; the more extensive network of reserves off of California's Channel Islands; and of several remote island marine reserves in the Caribbean and Central Pacific are especially noteworthy and indicative of this trend. Among other more developed countries, the continued expansion of New Zealand's national network of marine reserves and the more recent and extensive advances in development of marine reserve networks in Australia (see chapter 11) likely lie at the leading edge of marine reserve progress. Similarly, developing national marine reserve networks in the Bahamas (see chapter 9) and in Belize (see chapter 10) are representative of the forefront of marine reserve progress among less developed countries.

In 1998, we initiated discussions with Island Press regarding the pressing need for a state-of-the-art book on marine reserves detailing the arguments and

science behind, the evidence for, the global experience with, current trends, practices, and issues related to, and future prospects for them. This book is the result of those discussions and our attempt to fill this need. Probably the greatest challenge we have faced in putting it together has been trying to keep pace with the rapid and accelerating pace of progress with respect to both marine reserve development and science. A scientific colleague recently likened this effort to the labor of Sisyphus, accurately suggesting that just when we thought we were coming to closure on a piece of the book, new information or developments would surface that we felt compelled to include. At times, we certainly felt like Sisyphus!

As we look forward to the book's publication in 2004, we intend and believe it will provide a strong overview of the current state of the art with respect to marine reserve science, design, and use. In assembling the book, we recognized that it could not be fully comprehensive, all-inclusive, or completely up-to-date. Even if such a book were possible to compose, it would not remain so through publication. Instead, we strove to highlight major issues, critical arguments and information, representative and exceptional examples, key progress and trends, and likely future directions and prospects. Consequently, while some details may quickly become dated, we fully expect the major themes and ideas contained in the book will remain relevant for the foreseeable future. We further intend and expect it be relevant to a broad audience including non-expert scientists, students, managers, decision-makers, conservationists, stakeholders, and an increasingly educated and concerned segment of the lay public. The primary scientific literature on marine reserves has become so extensive at this point that no book could exhaustively review all of it. Rather, we have selected those examples we feel are most important for discussion, included a broad and representative cross section for additional depth, and synthesized both to provide a comprehensive overview. The lack of an existing easily accessible overview and synthesis on marine reserves was a primary motivation for writing this book and is the vacant niche we are attempting to fill with it. Readers interested in exploring the primary literature more fully should find a strong base here for such exploration.

The rapid and accelerating progress with respect to marine reserve development and science around the globe, across many and diverse areas and situations—driven by locally appropriate and variable approaches, but employing common themes—will likely continue. We avoid a one-size-fits-all approach to marine reserves, but rather highlight what has and hasn't proven successful in different situations, draw conclusions where appropriate based on these

experiences, suggest general guidelines, and attempt to provide an accessible information base and foundation on which interested parties can draw and build approaches and solutions tailored to their individual needs.

Marine reserves remain controversial and contentious in many places and among some stakeholders, despite, and in some cases because of, the considerable progress made to date in many areas with the participation of many stakeholders. In the United States, there has been some backlash within certain user communities to the successful establishment of marine reserves in the Florida Keys and Channel Islands. Yet, in the long run, we believe that the resulting public debate on marine reserves will be a net benefit and that recent progress on marine reserve science, design, and use will continue and likely accelerate further. The spirited debate regarding marine reserves motivated us in preparing this book, not because we endeavor to end that debate, but because we strive to inform it. Attempts to stifle or avoid such debate often backfire and are unwise, though tools for keeping it civil, respectful, and constructive are warranted and discussed in the book (see especially chapter 6). A lively and vigorous discussion of marine reserve issues among many constituencies, across multiple public sectors, and at a variety of levels is highly desirable, much needed, and likely essential to their continued success as a key marine policy tool. Our experience and philosophy with respect to this is much in line with former U.S. President John F. Kennedy who voiced: “My experience in government is that when things are non-controversial and beautifully coordinated, there is not much going on.”

Human alteration of marine ecosystems and their living inhabitants continues to accelerate and expand, but increased public awareness of such anthropogenic change and related changes in societal values and ethics offer some hope for the oceans’ future. These two factors combined with the continued failure of other existing management tools to successfully address the former and adapt to or reflect the latter, fuel our belief that the use of marine reserves will continue to advance. Marine reserves and the debate about their use are at least as much about societal goals, values, and ethics related to marine resource use as their science and design, though debate over the latter often masks more fundamental disagreement over the former. Nonetheless, such discord will likely ameliorate somewhat as the needs of ecosystem protection and more traditional fisheries management increasingly converge. The first several chapters emphasize these themes.

Responsible stewardship and intergenerational equity are among the goals and benefits of marine reserves. At a personal level, furthering intergenera-

tional responsibility was among the primary incentives for compiling this book. I feel privileged to have enjoyed a range of ocean experiences and retain vivid recollections of those from my formative years. I recall sport fishing with my father as a youth and his descriptions of the former ocean bounty from his youth and at times questioning their veracity. Several decades later, I am teaching my two young children to fish, enjoy, and protect the oceans and realize much to my amazement that I too have seen changes in ocean life of a similar or greater magnitude. Marine reserves afford a tool for preserving and restoring wild ocean ecosystems and their former abundance and diversity of marine life, so that our and future generations can continue to use and enjoy them. We hope this book helps to achieve that goal.

Jack A. Sobel
The Ocean Conservancy

Acknowledgments

Completing this book was not easy and it did not happen overnight. Neither science nor policy writing is ever easy. The level of difficulty increases synergistically when you combine them. The fact that marine reserves were a hot issue scientifically and politically when we embarked on this journey, and have only become hotter since, increased the challenge further. Meeting this challenge required teamwork and support from many, all of whom we acknowledge and thank, a few of whom we specifically mention below.

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