Communicating marine reserve science to diverse audiences

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As human impacts cause ecosystem-wide changes in the oceans, the need to protect and restore marine resources has led to increasing calls for and establishment of marine reserves. Scientific information about marine reserves has multiplied over the last decade, providing useful knowledge about this tool for resource users, managers, policy makers, and the general public. This information must be conveyed to nonscientists in a nontechnical, credible, and neutral format, but most scientists are not trained to communicate in this style or to develop effective strategies for sharing their scientific knowledge. Here, we present a case study from California, in which communicating scientific information during the process to establish marine reserves in the Channel Islands and along the California mainland coast expanded into an international communication effort. We discuss how to develop a strategy for communicating marine reserve science to diverse audiences and highlight the influence that effective science communication can have in discussions about marine management.

marine protected areas | science education | public outreach | communication strategy | California

As scientists, we develop hypotheses, collect data, analyze results, and become the keepers of a vast amount of information, much of it relevant to those beyond our scientific community. Scientists often receive considerable levels of public trust and respect (1), and scientific data are considered valuable, for example, when seeking the best way to protect our natural resources. Often we assume that our published scientific research is reaching those who are making decisions or are involved with management discussions. In reality, many stakeholders and policy makers still do not know about the breadth of scientific information that could inform their management efforts, and they may assume these data do not yet exist. Thus, it is imperative to share relevant research with decision makers. When scientists effectively present the results of impartial studies and identify what is known and what is unknown, they can encourage collaborative, data-based discussions about different management options and how to implement them, given the tradeoffs among stakeholders' interests. This process also can benefit scientists as they demonstrate to funders the outreach and education potential for their data; many foundations and agencies are interested in funding research that has a political or social connection. Communication efforts also can help to inspire new ideas for research that informs management questions and may generate connections with other scientists outside a narrow range of expertise.

Science communication is particularly important for marine resource management. Managers, policy makers, and increasing segments of the general public are learning that the old paradigm of an ocean with limitless bounty is far from true. Recent research has shown that no marine ecosystem remains untouched by human influence (2), and many regions have been burdened by historical overfishing (3) and other stressors, calling into question our present understanding of what constitutes a "healthy" marine system (4). Science can provide important insight into solutions to ocean degradation. For example, extensive study has demonstrated that fully protected no-take marine reserves can be important tools for protecting ecosystems from extractive activities and restoring marine habitats and species. Ecologic field studies of marine reserves have demonstrated positive effects on biologic measures (e.g., biomass and density) inside their borders (5–7) and in the adjacent fished waters (8, 9). Consequently, governments and local communities are increasingly considering marine reserves or networks of reserves as a means of reducing threats to marine ecosystems.

By definition, reserves restrict human activities, creating a tradeoff between conservation and use. There are many stakeholders to consider in these management decisions, including resource users, local and national interest groups, coastal communities, managers, and political officials. These diverse groups have a wide range of needs, values, and opinions about marine reserves as a management tool and can often enter into conflict because of their different perspectives (10). Particularly for those whose livelihoods are tied to marine resources, such as the fishermen who will be excluded from a no-take area, the term "marine reserve" can evoke a suite of negative connotations (11), and disagreements about the best approach to management can lead to a combative, politicized atmosphere. However, scientists remain a respected source of information in many dialogues about marine reserves (12–14), and thus, clear communication by scientists about the effects of marine reserves is crucial for science-based management decisions as well as public understanding and compliance with regulations.

In this article we present steps for developing an effective science communication strategy, focusing on marine reserves. We then illustrate these steps using examples from a marine reserve planning process in California that expanded over time to reach global audiences. We end with a suite of lessons learned during the process of communicating marine reserve science to nonscientific audiences.

Developing a Strategy for Communicating Marine Reserve Science

As scientists, we focus on accuracy, precision, and critical dialogue. This complex and technical approach to discussing data is poorly suited for sharing findings with nonscientists (15), yet science emphasizes unbiased results, which are critical to the public and political discourse about marine resource management. Scientific guidelines serve as the starting point for an increasing number of reserve planning discussions (16). As a result, there is a high demand for scientists who are willing and able to act as "honest brokers" of

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information and communicate science in a clear, accessible, and neutral manner.

It can be intimidating for scientists to enter the debate about marine reserves, especially when doing so exposes them to criticism and, potentially, personal attacks from all sides of the debate. A step-by-step communication strategy can help a scientist prepare for common questions or arguments, clarify what information is most important and what may only be marginally useful, identify the appropriate tools for delivering that information, and refine his or her messages. We suggest that the development of a communication strategy can be guided by four key steps.

Step 1: Know the Audience. The outdated "deficit" model of science communication, which characterizes top-down transmission of scientific data as the antidote to "public ignorance," runs the risk of alienating key audiences who are knowledgeable about the issue (1). Effective communication is a process, not simply a one-way delivery of published data (15). Identifying and understanding your audience is a critical first step in this process (16–18).

Begin by identifying who is asking for information and whom else you would like to reach. Key participants for successful marine reserve planning include local communities, resource users, interest groups, managers, agency representatives, and public officials (19, 20). Members of the public who are not directly involved also may become interested as they hear more about marine reserves via local media outlets and word of mouth. From a broad perspective, communication of marine reserve science does not need to be limited to those involved or interested in a specific planning process; for example, students of varying ages may be a target audience best reached via classroom curricula.

Next, it is important to obtain a general understanding of each group's needs, values, levels of technical expertise, and educational background (21). This does not necessarily require quantitative polling and demographic data but should involve a thoughtful consideration of each group's values and needs, which you might glean from public statements, online forums, and personal interactions. Agency staff members working on a policy process are a useful resource if you need to distill a large amount of public input. Ideally, each product or presentation should be tailored to a specific audience; however, in time- and resource-limited situations, you may need to target multiple groups with a single product or endeavor. In such cases, understanding your multiple audiences is critical (22). For example, although it may be impossible to develop a single resource for users as diverse as school children and agency scientists, a jargon-free pamphlet summarizing key results might be effective for bringing information to politicians, members of interest groups, and agency officials.

Step 2: Identify the Main Messages. The wealth of available scientific information about marine reserves can be overwhelming, especially for nonspecialist audiences. Thus, the next step is to identify a communication goal and the clear messages needed to accomplish this goal. During this stage in the communication process, developing a strategy in partnership with communication professionals and policy experts can be especially critical for ensuring that your communication is effective.

Researchers have identified five broad responses to science communication: awareness; enjoyment or other affective responses; interest and voluntary involvement; the forming, reforming, or confirming of science-related opinions (or attitudes); and understanding of science content and processes (18). Identifying which of these you wish to achieve will better enable you to narrow the scope of information that you would like to communicate. For example, when communicating science in the context of a marine reserve planning process, the target responses tend to be increased awareness and understanding about the effects of reserves; these enable stakeholders to make informed decisions about whether and how to implement marine reserves.

Next you must articulate the essential ideas, results, or "take home messages" for achieving your communication goal(s). The list of main messages should be short because additional material—even related examples intended to illustrate an overarching theme—can detract from people's ability to retain a core concept (23). Communications experts use various tools to identify a story's main messages, but when the goal is to increase your audience's knowledge about reserves, one useful approach involves four important messages (24). First, the overarching message should identify the problem or context for the information, demonstrating why these data are necessary. For the case of marine reserves, a broad problem statement might be "overfishing and habitat destruction are degrading coastal ecosystems." Second, the audience needs to understand why this matters to them; in this scenario, changes to ocean ecosystems affect their capacity to provide benefits such as food, good water quality, and recreational opportunities, among others. However, if you expect a change in behavior based on the scientific information provided, audiences need a call to action, rather than strictly a message of "doom and gloom," and thus the next step is to provide a potential solution based on the data. For example, establishing marine reserves can protect both animals and habitats in a given area, preserving a more intact ecosystem. Finally, the audience needs to know what benefits will arise from these actions. For instance, when a marine reserve is established, local communities can benefit economically from increases in animals and plants inside and outside reserve borders. Each of the four messages should consist of one or two simple (but not simplistic) sentences, which may be supported by statistics, graphics, anecdotes, and so forth.

After the core ideas are in place, the language and presentation should be reworked to translate scientific concepts and terminology into lay-person's terms. Technical and complex graphic depictions of data should be revised to support common pattern recognition and mental associations, such as relating the color red to negative responses or activities. Graphs based on logical inferences, such as those that require your audience to extract trends or compare relative differences, should be avoided (25). Although translating scientific information into engaging, jargon-free text and straightforward figures can be challenging, scientific arguments are not inherently inaccessible and can be effectively communicated with thoughtful and creative strategies (26).

Finally, communicating uncertainty in scientific understanding can be challenging to do in a way that does not undermine the power of the main messages. For example, it is necessary to include confidence intervals in peer-reviewed publications so that other scientists can review the precision of certain results and evaluate the statistical significance. However, confidence intervals may not be meaningful to a nonscientist and may seem to render the results imprecise and therefore meaningless. Concepts such as confidence intervals are best communicated to a general audience by speaking about averages or medians and specifically identifying them as the general response within a range of results. Furthermore, concepts of uncertainty are quite applicable to daily life—we consult the weather report even though there is still a high level of uncertainty about whether it will actually rain. It is important for scientists to be clear about what is known, what is unknown, and what is under debate. This requires a working knowledge of the most current data about reserves, and scientists should be prepared to answer questions using examples from their own marine reserve research as well as the recent and relevant work of others.

Step 3: Choose the Communication Tactics. Every scientist has his or her own communication strengths; some may be better at giving engaging presentations to large audiences, whereas others may excel at generating clear and concise written descriptions of scientific information. Furthermore, some audiences may learn more from an engaging presentation and discussion format, whereas others may benefit instead from a resource, such as a booklet, that they can hold in their hands and review at their own pace. Some users may be interested in the details of scientific methods and results, whereas others will be best reached through vivid pictures and graphics. It is important to select the communication tactics and tools best suited to your skill set, audience, and messages.

In-person interactions such as interviews, one-on-one meetings, or public presentations allow the audience to ask questions in real time and can connect a recognizable and relatable face to a scientist's name. Although such interactions can be spontaneous, they do require advance planning. Successful interviews and presentations usually require substantial practice for the speaker to be clear and remain on message. Spoken communication methods tend to be more limited in the amount of information that can reasonably be shared, particularly if it is not possible to use visual aids.

Printed materials vary widely, from one-page handouts to books with many chapters. The length, format, and style of these resources should be driven by the target audience (funding for time and resources not withstanding). Your particular audience, for example, may be best reached by a single-sheet flyer that communicates scientific information in a few words with easy-to-understand graphic depictions of changes inside reserves. There are no absolute rules about how to best design an effective handout or other printed resource, but existing research does provide some insight into effective font size and selection, image use, and layout of print materials (27–29). Written resources will not be effective for nonliterate audiences, although posters and pictorial representations can be tailored accordingly. Regardless, relying on printed materials for outreach requires a plan for actively sharing the communication tool(s), and resources for postage and distribution, which may prove prohibitive over time. Print materials also can quickly become out-of-date; therefore, clear statements about both when the data were collected and when the synthesis was conducted are critical for ensuring appropriate understanding of the applicability of the data.

Increasingly, our communication methods are transitioning to the exchange of ideas online. Web content, which is dynamic in nature, allows for continual updating of scientific information, linking of interrelated concepts, and an interactive learning experience. The most effective Web pages are developed to provide a variety of quality content, maximize ease of navigation and interactivity, and minimize download delay (30, 31). Websites allow users to follow many different paths through the same content, supporting their own preferences and pace for acquiring new information. Web-based tools such as social networking sites, blogs, online video hosting, and Google Earth also provide inventive new ways for interested audiences to connect to marine reserve science and to each other. Web-based resources can be particularly cost-effective for reaching a global audience. Furthermore, they offer a higher likelihood that non-target audiences, users that were not foreseen at the time of material development, will access the information. Most online resources, however, require significant time investments to maintain and update, and the dynamic nature of Web tools and rapid swings in usage trends can make it difficult to determine how long they will remain relevant. Further, user-generated Web tools such as opinion-based blogs can be inaccurate, and thus it is important to clearly identify the primary data source for science-based Web tools, differentiating them from advocacy or editorial musings.

Finally, mass media tools and entertainment products (such as commercials, movies or short films, and advertising campaigns) are compelling ways to share marine reserve science and environmental research as a whole. Scientists, who have generally been slow to use these types of communication tools, could benefit greatly from the communication expertise found in the movie industry, advertising firms, and graphic design groups. For scientists whose goal is to reach a wide audience, these "big business" resources can have an unmatched impact on communicating marine reserve science and other environmental issues. However, creative solutions are needed to finance the cost of such endeavors and/or build industry support for blockbuster marine reserve communications.

Step 4: Measuring Success as Communication Continues. Arguably the most challenging step in a communication strategy is measuring the success of outreach efforts, primarily because there is no single definition of success. If printed materials are part of the strategy, simple numbers of requests for the documents and the sources of these requests can give an idea of demand and reach based on geography and sector. Usage statistics and visitor metadata from Web sites track how many people view the information, but these do not describe impact. One means for assessing influence on opinions or behavior is to conduct surveys before and after the communication has taken place, an increasingly feasible task given the advent of online survey tools.

The real impact of communicating marine reserve science typically can only be measured qualitatively, by tracking events resulting from the communication. These may include the integration of key scientific messages about marine reserves into public documents, legal or otherwise; new collaborations developed among researchers or between researchers and nonscientist local experts; or the establishment of a network of marine reserves.

Regardless of the specific impacts, communication about marine reserve science with nonscientists is almost always a win-win situation: nonscientists learn more about what marine reserves can and cannot do, and scientists learn from the experiential knowledge of resource users and managers. This dialogue is not only a measure of success but also a key piece in the continuing cycle of communication. The exchanges among scientists and their targeted audiences often identify the most critical and applicable data for a marine reserve planning process. Inevitably, more research questions will arise, new audiences will be drawn into the conversation, and additional tools will become useful. A communication strategy should be cyclical, not linear (15), ensuring that we, as scientists, are not speaking at an audience but instead involving them in an ongoing process to understand the effects of marine reserves and collect the most informative scientific data.

Case Study: Marine Reserve Science for California and Beyond

One of the most comprehensive coast-wide marine protected area (MPA) planning processes is currently underway in California, as part of an initiative to protect marine resources using reserves and other protected areas (32). In 1999, the Channel Islands National Marine Sanctuary and California Department of Fish and Game initiated a public process to design a network of MPAs in the Channel Islands, engaging a diverse group of representative stakeholders under the guidance of the Sanctuary Advisory Council (33). Additionally, a Science Advisory Panel and Socioeconomic Team were formed to gather relevant information, provide ecologic guidelines for MPA design, and evaluate proposed MPA networks. These advisory groups shared scientific knowledge with nonscientists through public presentations to the stakeholder group and in public forums (34).

Concurrently, a scientific working group at the National Center for Ecological Analysis and Synthesis (NCEAS) met to answer a set of basic questions, including scientific guidance about where to locate marine reserves, how many to establish, how to distribute them spatially, what size reserves should be, and how to evaluate ecologic responses to reserve protection. The development of these key concepts was guided by the ongoing management conversations in the Channel Islands public process, and in turn the products of the working group formed the basis for public presentations and informed the development of the scientific guidelines for the Channel Islands MPAs. The scientific working group's results also were published in a special journal feature (35), which included information ranging from size and spacing guidelines based on larval dispersal distance (36) to a global metaanalysis of the ecologic effects of marine reserves (37).

As more and more communities requested scientific information about marine reserves, it became clear that a synthesis publication developed for nonscientists was necessary to communicate the science of marine reserves when scientists were not available for in-person interactions. Thus, an educational booklet and film, titled "The Science of Marine Reserves," were developed with the input of marine ecologists and science communication specialists (38). The booklet summarized the breadth of marine reserve data available in peer-reviewed publications, including those papers reviewed by the NCEAS working group as well as the publications it generated. A key graphic in the booklet showed the frequent increases in density, diversity, and size of fishes, invertebrates, and plants inside marine reserves around the world (37).

The "Science of Marine Reserves" synthesis presented publicly by scientists or through the educational booklet continued to inform discussions about MPAs in California, which gained momentum after the Marine Life Protection Act was passed in 1999 (Assembly Bill 993). This began an initiative to establish a statewide network of MPAs, region by region along the coast, again informed by guidelines developed by scientists serving as advisory members of a Master Plan Science Advisory Team (13, 32). As a result of the increased attention on MPAs, academics, scientists, managers, policy makers, nongovernmental organizations, politicians, and interested lay people from the United States continued to request the "Science of Marine Reserves" booklet and film. These were accompanied by growing numbers of requests from international locations such as Australia, New Zealand, the Pacific Islands, Mexico, Central and South America, Africa, Europe, and Indonesia. After the initial 15,000 booklet copies were distributed to these and other locations, an additional printing of 3,750 copies was required to continue meeting the demand for information.

As the number of scientific publications about marine reserves continued to grow, more than doubling between 2001 (when the first metaanalysis was conducted) and 2006 (5, 37), users asked for a new resource that synthesized current data and presented the effects of reserves using regional examples and case studies. As a result, three new editions of the educational booklet were developed, one geared toward US audiences (in both English and Spanish), one for general international audiences, and one for Latin American and Caribbean audiences (in both English and Spanish) (39). An updated metaanalysis synthesized the explosion of new research, illustrating the great majority of positive responses in density, biomass, size, and diversity inside marine reserves across latitudes and species groups (5). These trends were illustrated with case studies, such as one from the Anacapa Island marine reserve in California, where lobsters inside the reserve were released from fishing pressure and thus increased in density, leading to lower densities of their urchin prey and larger percentage areas of ungrazed kelp forests (Fig. 1).

The second editions of the booklet built on the experience gained during the production of the original version by using feedback from mailed and online surveys and discussing the presentation of new concepts with policy makers and communication specialists. This input helped to identify which concepts had not been clearly articulated, what additional concepts the readers wanted to learn about, which graphic formats were too technical, and which graphics and messages were clear and useful to the original readers. The booklet update process also created an even larger group of coauthors and reviewers to ensure that the science represented was truly international and applicable to global audiences. Seven convening lead authors and 18 contributing authors from 12 countries reviewed the up-to-date scientific literature, developed new graphics, and selected marine reserve case studies. A total of 101 scientist and stakeholder reviewers from 22 countries and two US territories provided comments on the draft booklet. To date, more than 10,000 of the updated booklets have been distributed to 57 countries and three US territories.

The compiled scientific information about marine reserves continues to be relevant on the global scale, yet distributing booklets in proportion to the wide interest is costly and difficult. In response, a follow-up initiative to make the booklet information available online has been launched. Case studies are now hosted online at Protect Planet Ocean, a Web site that offers users the opportunity to browse general information about marine reserves and other types of MPAs, explore a global database of MPAs and upload their own content, track progress on governments' commitments to establish MPAs, and make use of a range of related learning opportunities. Since the launch of the site in October 2008, 600,000 visitors from 220 countries visited Protect Planet Ocean in 126 languages during the first 12 months.

Additionally, an MPA layer in Google Earth's new Ocean feature complements the Protect Planet Ocean Web site by displaying the locations of MPAs around the globe along with videos, stories, and facts about these sites. Data from peer-reviewed publications synthesized in "The Science of Marine Reserves" booklet are represented as engaging animations

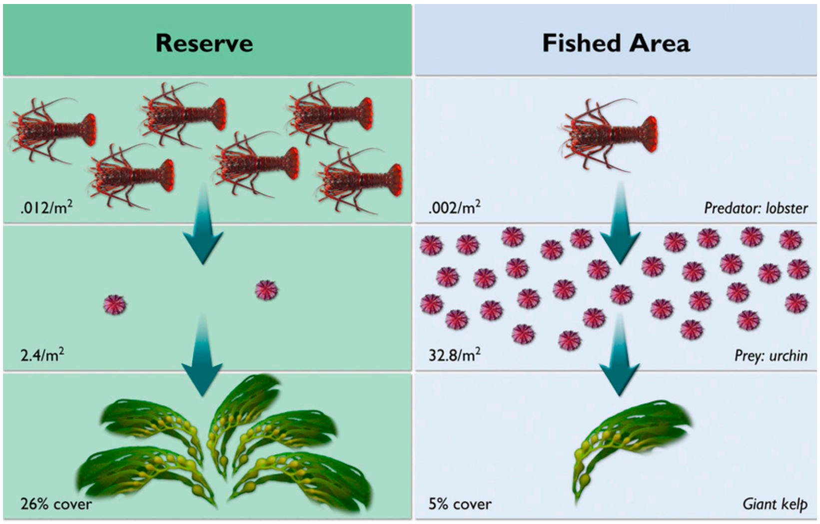

Fig. 1. Depiction of numeric data from a marine reserve study by Behrens and Lafferty (45) in a nonnumeric format for general audiences. In the Anacapa Island marine reserve in California, abundant lobsters keep their urchin prey in check, allowing kelp forests to flourish. Reprinted with permission from *The Science of Marine Reserves*, published by the Partnership for Interdisciplinary Studies of Coastal Oceans.

at a subset of these sites. Instead of presenting numeric graphs, ecologic changes are depicted by organism icons that represent relative changes in biomass, density, and size for species documented within the reserve (Fig. 2). By clicking a button, the user can see how the establishment of a marine reserve led to differences in the marine community inside; fishes grow and increase in number. Science communication specialists helped to ensure that these animations are intuitive for general audiences, and a team of scientists carefully developed the icons and scaled their growth and numeric responses to reflect the published data from visual surveys. An online tour of these marine reserves with animated data allows users to "fly around the world" in Google Earth and view the effects of different marine reserves.

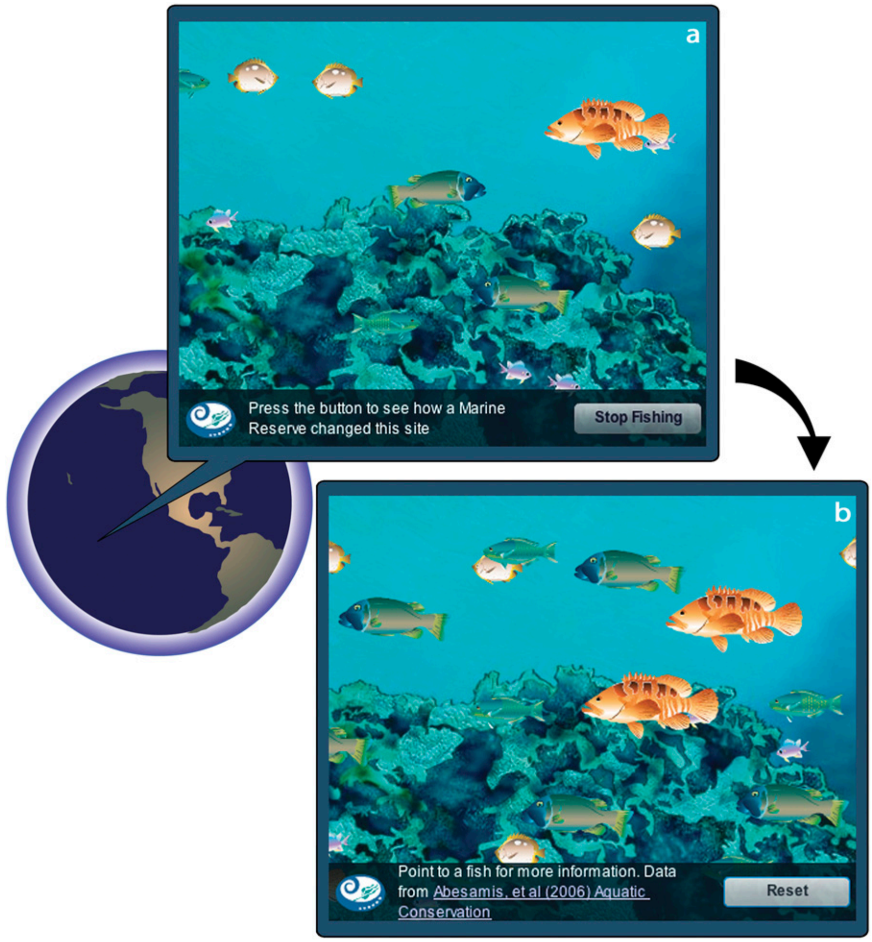

Fig. 2. Depiction of numeric survey data from Apo Island, Philippines (46) in animation form used with Google Earth to illustrate the density and size of organisms (*A*) inside and (*B*) outside the Apo Island marine reserve.

Lessons Learned from Communication in Practice

The process of communicating marine reserve science first to California audiences and then on the larger global stage provided some key lessons. First, we discovered that a critical part of this process was the external review of the booklets. The booklet authors, as well as outside scientists with backgrounds in a diversity of fields, verified the accuracy of information translated from technical to more accessible language. Conversely, nonscientist stakeholders and laypersons verified whether the concepts were stated clearly. The resulting text is precise, simple, credible, and useful. An unexpected but useful outcome of the review process was the identification of research questions that were not answered in the booklets, either through oversight, space limitation, or lack of data. The absence of research on vital questions served to underscore the necessity of ongoing research or the creation of new science plans for addressing these questions. Since the process began, conference symposia, synthetic papers (40), and journal special issues on marine reserves (including this journal issues) have advanced marine reserve science by addressing some of the remaining questions identified during this communication effort.

We did not have the resources through this process to provide each of our audiences with a unique product. To bridge everything from the streamlined main messages to the technical primary literature, we used a four-tier approach in the booklet. Each level elaborated on the previous one, offering more technical detail. First, we presented information through engaging pictures and graphics—pictorial representations of data that communicate a concept with minimal or no words. For users who wanted to learn more, the main messages of the scientific study or concept were summarized in a few key bullet points. This short format helped to articulate the main messages clearly and concisely. For users who were interested in the details of a scientific study, expanded text told a story about the effects of marine reserves. The text provided more information but avoided jargon and technical descriptions, drawing on regional case studies to provide concrete examples that readers could place in context. Finally, the original research sources were cited, allowing the user to consult the scientific literature if they were interested in further detail. This last piece is a critical step, because it also communicated that the information was science-based and not the result of subjective advocacy by a special interest group. In total, this tiered approach allowed us to offer exactly as much, or as little, information requested by readers with a range of interests.

It has been challenging to provide relevant information to all stakeholder groups through the printed booklets and Web-based communication. For example, in a review response to the first draft of the booklet update, a fisherman requested more information about density-dependent population control and stock-recruitment relationships and did not find the booklet useful to him without this content. Stakeholders are a highly varied audience according to their personal experiences with reserves. In some regions, reserves do not yet exist, and thus there is concern that their effect on local fisheries and other resources cannot be accurately inferred. In other cases, reserves have had strong, positive effects inside their borders and augmented local fisheries over time through the spillover of adults (41, 42), sometimes changing previously negative opinions of local stakeholders. The responses of human communities to reserves can change over time; for example, in some modeled scenarios, fishermen are more willing to pay, in both costs and missed opportunities, for the establishment of a reserve if it will benefit them in the long run (43). Unfortunately, it has proved difficult to get feedback about our communication tactics from some stakeholders, particularly fishermen of diverse backgrounds. Although some groups, such as the Communidad y

Bioversidad project in Baja California and the International Collective in Support of Fishworkers based in India, have used the booklet to reach out to fishermen, these tools are not adequate for reaching the diversity of fishermen in developed and developing countries. More appropriate methods should be developed to communicate with this and other key groups of marine reserve stakeholders.

Finally, we were able to build our communication strategy to be expandable, flexible, and adaptable. Specifically, we broadened our reach by adding products (public presentations, educational booklets, online case studies, interactive animations as part of a featured layer in Google Earth) over time with the intent to expand the geographic and cross-sector reach of the scientific information. The flexibility of these multiple formats increased the likelihood that people with diverse learning preferences would be connected to our compiled information through one of our communication tools. It is also worthwhile to note that little additional information was needed to develop new tools after the first educational booklet was created. Although the booklet update in 2007 that produced three new editions did increase the number of concepts and topics that were included, the design format changed little, and the page layout of the case studies was easily adaptable to the online case study pages. The creation of these multiple tools also provided numerous metrics for success, including mailing requests, Web site usage statistics, collaborations among scientists who served as authors or reviewers, and the use of scientific guidelines generated in the literature as part of formal marine reserve planning processes (13, 34, 44)

Scientists, graphic designers, communication professionals, and policy experts all collaborated on this project to communicate marine reserves in scientifically accurate yet engaging and easily accessible formats. The process of developing these resources was unique, not only because of these partnerships, but also in the funding provided to undertake such an effort. We assert that this model of collaborative communication should become more prevalent. Funding to support the communication of scientific results should be an inherent component of research grants, especially because some tools, such as online resources, can be relatively economical to produce. Regardless, scientists should make the most of the growing body of available resources. Communication training programs and seminars, consulting services, and graphic design firms geared toward working with scientists all can contribute useful advice, techniques, and coaching for communicating scientific information to those who need it most—the individuals who are asking questions and making decisions about marine reserves and other natural resource management and conservation issues.

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