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International News and Analysis on Marine Protected Areas

Seeking the Win-Win Situation: A Brief Guide to Balancing Conservation and Fisheries Yields in Reserve Design

The list of potential benefits from closing ocean areas to extractive uses include the conservation of biodiversity within these reserves and the improvement of conditions for fisheries outside of them — the latter owing to the export of larvae and spillover of adults from the protected areas. Some marine reserves have been designated with both conservation and increased fisheries yields as goals, seeking a win-win situation for biodiversity and fishermen.

But the ability of reserves to achieve both goals simultaneously remains easier to conceptualize than to document, due partly to the challenges of following rigorous scientific protocols in the ocean environment (see pages 3-4 for more coverage of the dilemma). As a result, practitioners looking for guidance on balancing conservation and fisheries yields are left to adapt often-complex population and economics models to their protected areas — no easy task. This month, in an attempt to distill a set of lessons and recommendations from the theoretical study of marine reserves, *MPA News* discusses with scientists how practitioners can tackle the challenge.

Using decision-support tools

Trevor Ward, former program manager for environmental research in the Division of Fisheries at Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO), says achieving the win-win situation — what he calls the "double payoff" — is possible. In fact, as he points out, Australia's government and the Australian Northern Prawn Fishery (NPF) are working right now to design reserves capable of delivering the double payoff.

Ward recently co-authored a report with Eddie Hegerl of Marine Ecosystem Policy Advisors (an Australian consultancy) on the use of MPAs in ecosystem-based management of fisheries (*MPA News* 5:5). They state that for MPAs to meet conservation and fisheries goals, there must be strong cooperation between conservation and fisheries agencies, and effective partnerships with stakeholders, as with the prawn fishery example. They caution that designs for the double payoff may require parameters and criteria that are fairly complex to account for the impact of multiple reserve scenarios on fish populations, habitats, and fisheries economics.

"Conservation and fishery objectives can sometimes be in opposition to each other and involve large uncertainties," says Ward. "So achieving good double-payoff reserve designs will require decision-support tools that can optimize across multiple competing objectives, and can admit multiple competing costs and measures of uncertainty." To manage this complexity, computers and special software are usually necessary. Ward says one of the most promising tools — particularly for larger, multi-habitat, multi-species reserve situations — is MARXAN, which was used to develop the re-zoning scheme for the Great Barrier Reef Marine Park (*MPA News* 4:11). Information on MARXAN is available online at http://www.ecology.uq.edu.au/marxan.htm.

In some parts of the world, however, reserve planners may not have easy access to sophisticated decision-support tools, nor the expertise to operate them. Ward says it is still possible to achieve a win-win situation in these cases, at least for smaller, simpler reserve scenarios. "The most important aspect of double-payoff reserve design is the problem formulation and logical framework that underpins the approach to reserve selection, and particularly accepting the equivalence of the two different sets of objectives," says Ward. His advice to reserve planners without access to advanced decision-support systems is to ensure that:

- Objectives are clearly established in conjunction with a broad range of stakeholders;
- A fully systematic approach to reserve design is used, including measurement and mapping of biodiversity;
- The best available technical data and support are used;
- The reserve is well-integrated to the fishery management system;
- All assumptions and interim decisions in the reserve selection process are clearly articulated and documented for public review; and
- There is an effective monitoring system that relates to each objective, as a basis for future improvements in reserve design.

Ward says it is important to recognize that double-payoff reserves will not necessarily be the only type of protected area used to protect biodiversity in a particular region. "Since areas important to fisheries will not always cover the full spectrum of ecosystem and habitat

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Dear subscriber:
This issue of *MPA News* covers the months of December 2003 and January 2004, allowing our staff a year-end holiday. In February, our regular monthly delivery will resume.

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Alan Hastings and Louis W. Botsford. 2003. Comparing designs of marine reserves for fisheries and for biodiversity. *Ecological Applications* 13(1) Supplement, pp. S65-S70. http://www.esapubs.org/esapubs/journals/applications_main.htm (Click your way through to Volume 13 (2003) of *Ecological Applications*, then click "Issue 1, Supplement".)

Jim Sanchirico's work on the economics of marine reserves is available at http://www.rff.org/Sanchirico.cfm

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types, or migratory species, other measures may be needed to ensure conservation of the full complement of biodiversity of a region," he says. Double-payoff reserves can be designed within an integrated region-wide planning process, in which different reserve types are developed concurrently to provide for marine resource management and biodiversity conservation. "I see double-payoff reserves as complementing and enhancing other MPA initiatives, not replacing them," he says.

Different designs for different goals

Reserves to achieve win-win situations for fish conservation and fisheries yields will be designed differently from those designed only for conservation, says Loo Botsford, a biologist at the University of California at Davis who has compared reserve-design models for the different goals. In short, he says, areas designed for conservation are best configured with a single large no-take zone, ensuring that most fish and larvae remain inside the reserve. Closures to aid fisheries, however, require networks of small reserves to maximize edge effects (larvae dispersing to fished areas), in turn maximizing yield. Incidentally, notes Botsford, the optimal fisheries reserve design could close a larger fraction of the coastline than the optimal conservation design.

Although this comparison suggests a basic conflict between the goals, he says a reconciliation may be possible. In a modelling study he conducted with Alan Hastings (see box), Botsford noted that both conservation and fisheries needs could be served by the optimal fisheries reserve. Although conservation benefits would not be optimized by this design (in other words, fish would be captured), the benefits would still be significant, owing partly to the fact that the fisheries-reserve design closes a greater fraction of the coast. Whether the implementation of marine reserves actually increased catch in the fishery would depend on several factors:

- How hard the population had been fished. For species with sedentary adults, reserves can increase catch only if recruitment has been substantially diminished.
- The response of fishermen. If the same number of fishermen continued fishing between the reserves, an increase in catch would be less likely.
- Movement of adults. When adult movement is considered, making reserves smaller generally leads to greater losses from the reserves. There need to be some losses because that is the catch, but if losses are too great, the population will not be sustainable.

"For species with sedentary adults, a reserve with a specific linear dimension will sustain species with an average larval dispersal distance up to and including that dimension," says Botsford. "However, a system of small reserves will sustain species with any arbitrary average dispersal distance, as long as that system of reserves covers a certain minimum fraction of the coastline." Provided the fraction of coastline is large enough to sustain the species of interest, the network of smaller reserves should aid fisheries and conservation.

Botsford says there are several uncertainties to keep in mind when considering these results. One is the fraction of coastline that needs to be in reserves to sustain species dispersing all distances (i.e., the fraction of lifetime reproduction needed for sustainability), which is also one of the dominant uncertainties in conventional fisheries management. Another is that the results depend on larval dispersal patterns, about which there is little knowledge for most fish species (*MPA News* 4:9).

Closing marginally productive areas

Jim Sanchirico is an economist with Resources for the Future, a research institution studying environmental and resource policy, located in Washington, DC (USA). In studying the economics of marine reserves, he has shown that to achieve win-win situations for conservation and fisheries, the optimal site for closure may not always be the most biologically productive one.

"The best option for fishery enhancement may lie in closing a marginally productive site, which will still yield biological benefits," says Sanchirico. Assuming that entry to the fishery is limited through a licensing system, closing the most productive site theoretically increases costs for fishermen, thereby decreasing the value of their licenses. Increased costs for fishermen also raise the likelihood of strong opposition to reserve plans from the fishing industry. If planners are determined to close a productive site for biodiversity reasons, says Sanchirico, they could consider compensating the fishermen for the resulting lost profits. Compensation is controversial, he says, but it is consistent with the goal of aiding fisheries.

Site selection is not as easy as just picking out sites based on their biological and economic characteristics, he says. Planners must consider such factors as the condition of remaining fishable habitat, particularly in patches that are connected to the reserve. The value of a site as a reserve — as measured by bioeconomic habitat characteristics, dispersal processes of species, and oceanographic features of the system — is affected by the characteristics of these surrounding areas.

Again, there are a number of sources of uncertainty there. Nonetheless, Sanchirico notes, managers and policymakers make decisions in the face of uncertainty all the time: their decisions are based largely on the amount of risk they are willing to take with the results of their decisions. Preferably, Sanchirico would like to see managers invest in long-term, proactive, interdisciplinary research on bioregional ocean systems, including studies of the biology, ecology, oceanographic, and socioeconomic components of these systems. "So when the question arises, 'Which area do we set aside?', we will be better prepared to answer it," he says.

MPA Perspective The Science of Marine Reserves: How Much of It Is Science?

By Trevor Willis, Russell Millar, Russ Babcock & Nick Tolimieri

Many recent scientific papers on the subject of marine reserve effects contain statements within their introductions along the lines of "It is well known that exploited species exhibit increases in density and mean size within reserves", supported by a number of citations. A closer look at the cited papers shows that many are review articles. Of the empirical studies published, most present ambiguous evidence for recovery. In fact, between 1990 and 2001, only 42% of published papers in this area contained empirical data, and many of these were difficult to interpret because of inadequate experimental design.

In the marine reserve context there are many reasons why researchers might have limits on their sampling designs. However, a critical evaluation of the experimental designs employed by many published studies brought to light the following problems with replication and lack of control sites:

(1) insufficient sample replication (*e.g.*, only one site sampled inside and outside a reserve, or no control sites sampled at all)

(2) spatial confounding (*e.g.*, all control sites located only at one end of the reserve, so that comparisons are confounded by unknown location effects)

(3) lack of temporal replication (most studies consist of surveys done at only one time)

(4) lack of replication at the reserve level limiting the generality of results (although in many cases this reflects the number of reserves available).

(5) non-random placement of reserves — *i.e.*, often reserves are sited to include "special" or unique features, which causes difficulties in selecting valid control sites (this is obviously no fault of the researchers).

To date, there are no studies that avoid the above problems as well as possessing a time series of "before" and "after" data.

How many studies unambiguously demonstrate significant within-reserve increases in the density of exploited species? With a sufficiently large sample size, a statistically significant difference between two sites (separated either spatially or temporally) can almost always be obtained due simply to true natural biological variability between the sites. That is, the null hypothesis of no difference between two biological entities is necessarily false. If we (conservatively) use a 100% increase in density as a minimum criterion for claiming the existence of a "reserve effect", and ignore flaws in sampling design, then there are only a handful of instances where differences in density of individual species between reserve and fished areas can be regarded as biologically significant. In many other cases, slight trends toward higher reserve densities have been described, but these were of insufficient magnitude to confidently attribute them to reserve effects, rather than real biological variability at the spatial or temporal level. If we consider only those studies that are replicated in both time and space, to our knowledge there are only a few that establish increases in excess of 100%.

Several theoretical studies have indicated that marine reserves can provide increases or equivalence in fisheries yields under the assumed model and parameter values. However, if management decisions are based upon models built on unquestioned assumptions then we may find ourselves making costly errors. We reinforce this point by noting that there have been yield models produced which respectively predict reserves can increase fishery yield, may have no effect on fishery yield, or can be detrimental to fishery yield. Taken together, the conflicting conclusions from various plausible models lead us back to the beginning, where we must admit that, at present, we cannot predict what the effects of marine reserves might be for any given species. While the theoretical work done to date has helped to identify and formalize competing hypotheses, it should not be used to make quantitative management decisions relating to particular species. What is needed now is for models to be shaped by empirical data rather than being built purely from general assumptions and ancillary knowledge.

continued on next page

Editor's note Theory holds that no-take marine reserves can increase fish populations outside their boundaries via export of larvae and spillover of adults. But definitive evidence of that effect can be difficult to show due to an array of challenges, including setting adequate control sites in complex ocean environments and handling the costs of scientific monitoring. As a result, concerns are expressed about reserve studies falling short of following what would ordinarily be considered scientifically robust protocols. (Similar concerns exist with respect to data used in fisheries, coastal, and pollution management.)

Along this line, *MPA News* presents two perspective pieces. The one at left, by a team of fisheries biologists from New Zealand, calls on scientists to apply greater rigor to their reserve studies. The second, by British biologists, iterates the many obstacles involved in demonstrating spillover effects of marine reserves (next page).

Taken together, they can be viewed as posing a conundrum for marine reserve managers, although neither was written with management concerns primarily in mind. The dilemma: we all want the best science on reserves, but to get it will require significantly more time and money, including for long-term studies of sites both before and after their protection.

Earlier issues of *MPA News* have approached the subject of marine reserve science (*MPA News* 4:4, 4:5, and 5:3). Our intent here is not to rehash arguments but to try to move the dialogue to another level. Assuming that reserve effects are relatively site-specific — affected by each reserve's ecology and management — we ask readers to respond to the question: "How can managers balance their allocations of scarce management resources among competing demands to: (a) determine whether (and to what extent) spillover is occurring, and (b) otherwise provide protection, education, planning, and administration for the reserve itself?"

Or is that the appropriate question?

Since the management goals of marine reserves are many and varied, and the biology and ecology of exploited species also vary from place to place, the huge amount of effort currently being spent on "optimizing" marine reserve design is probably largely a waste of time and energy. There is probably no such thing as an optimal reserve — what is good for one species may not be particularly useful for another. A more effective role for research in the context of fisheries management might be to establish what are the *minimum* requirements for protection of exploited species. A return to more natural ecosystem function will probably occur as a by-product of protected areas that focus on targeted species, and more research effort should also be directed toward the effects of not fishing on unexploited species.

This comment is not intended to imply criticism of those working for the establishment of marine reserves, and it is not intended to counteract the precautionary principle. Nor should this comment be interpreted as "anti-reserve". Rather, it is a plea for researchers to apply the same rigor to examination of the fisheries-related efficacy of marine reserves as they would apply to other environmental effects studies. Perhaps more importantly, this plea also goes out to those in a position to fund this research. They must ensure that adequate planning and resources are allocated to make it possible to implement rigorous survey designs, and that this is done far enough in advance of reserve establishment so that effects outside their boundaries can be detected. Ultimately, in a field where the division between science and politics is becoming increasingly blurry, poorly conducted studies or those with major design flaws serve to undermine the credibility of scientists, and provide ammunition to those who wish to oppose reserve proposals for reasons of their own.

(This piece was adapted by the authors from: Willis T.J., Millar R.B., Babcock R.C. and Tolimieri N. 2003. Burdens of evidence and the benefits of marine reserves: putting Descartes before des horse? *Environmental Conservation* 30: 97-103. Copyright 2003 Foundation for Environmental Conservation)

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MPA Perspective Difficulties Involved in Studying Marine Reserves

By Fiona Gell and Callum Roberts

Some scientists point out, rightly, that most studies of marine reserves employ designs which cannot unequivocally deliver a verdict on whether they work. Many studies compare a single reserve with one or more control sites. Since in some cases (but certainly not all), reserves were chosen because they have good quality habitats, this leaves open the possibility that differences detected are habitat rather than protection effects. Similarly, changes over time in measures of reserve performance may be due to habitat or background environmental changes.

The strongest study design for reserves research is considered to be before-after-control-impact-pairs analysis (BACIP). Here several reserves (three or more) are paired with several control locations, and data collected at intervals before (ideally three or more times) and after protection. In this way, the effects of protection can be separated from those of habitat. Sites adjacent to reserves may receive spillover and will not be adequate controls. So to settle questions of spillover we need several sets of reserve-adjacent area-control site triplets. Our difficulties do not end there. Reserves can potentially export larvae tens of kilometers away, so sites within that supply envelope may also be affected by the reserve and will not represent true controls. Conditions and habitats in control and reserve sites must be matched closely, but as distance between them increases, conditions may diverge. Good controls are very difficult to find.

There are also human problems. Few funding organizations will support collection of several years of pre-protection data. Scientists also find it hard to maintain control over the design of reserve experiments. Management plans are often modified, reserve boundaries changed, and protection poorly implemented. It is hardly surprising then that almost no studies have achieved this level of design sophistication. Furthermore, almost none collect data on fishing effort, which is essential to interpreting findings. Without such data it is impossible to know whether absence of an effect is because reserves don't work or is just due to lack of protection.

Some people suggest that fishers' resistance to reserves will diminish or disappear when scientists produce better quality evidence, but we doubt this. Fishers are most often convinced of the usefulness of reserves through the experience of other fishers. This makes an all-round picture of how reserves have affected fishing, the wider community and the ecosystems, of more relevance than statistical tests. However, skeptical fishery managers and decision makers may be won over by stronger science. That said, we find it paradoxical that many managers place more faith in management tools whose performance has not been subject to the level of critical scrutiny they demand of reserves. This is not to say that seeking such a high standard of proof is not necessary for reserves. The next generation of studies must strive for it. But we should also demand the same evidence of efficacy for other fishery management tools. The poor state of the world's fisheries suggests these tools are not performing as intended.

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This piece was excerpted (with permission from Elsevier) from: Gell F.R. and Roberts C.M. 2003. Benefits beyond boundaries: the fishery effects of marine reserves. *Trends in Ecology and Evolution* 18:448-455. Copyright 2003 Elsevier

Effort Underway to Expand Use of World Heritage Convention for MPAs

The World Heritage Convention, adopted in 1972 by the United Nations Educational, Scientific and Cultural Organization (UNESCO), seeks to protect the world's most important cultural and natural heritage. In designating more than 700 locales as World Heritage sites — from Vatican City to the Taj Mahal to the Great Barrier Reef — the 177 state parties to the convention have indicated their desire to see these places preserved for future generations to enjoy.

Although the designation of World Heritage provides a potentially valuable mechanism for conserving marine ecosystems, such potential has remained relatively untapped. Of the World Heritage sites listed to date, fewer than 7% of them (56 sites) target coastal or marine features, and fewer than 10 of these are primarily marine. An initiative is now underway to expand the application of World Heritage across a range of ocean ecosystems, in part by demonstrating the special strengths of this legal instrument. *MPA News* examines the usefulness of World Heritage for MPAs and the strategy for building the mechanism's profile in the global MPA field.

Benefits of World Heritage status

To be awarded World Heritage status, a site is first nominated by its national government (state party), which must demonstrate the "outstanding universal value" of the site among other qualifications. A multinational committee compares the nominee to sites of similar type and decides whether it is unique and significant enough to merit designation. Providing proof of outstanding universal value is not always easy for marine sites: the relative lack of knowledge about marine ecosystems — compared to natural sites on land and cultural sites — can make conclusive comparative studies more of a challenge, though not impossible.

Designation as a World Heritage site brings benefits. By virtue of the nomination process, which requires that management plans be set for nominees, designated sites enjoy the advantage of having a management strategy approved by international experts and ready for immediate implementation. Marjaana Kokkonen, a natural heritage specialist at the UNESCO World Heritage Centre in Paris, says the nomination process is an important mechanism for ensuring strong site management. "Striving for World Heritage status often prompts the nominating country to improve conservation of the site," thus setting a higher conservation baseline, says Kokkonen.

The prestige associated with having a World Heritage site provides an incentive for national governments to ensure their sites do not become degraded. However, should threats to a site's heritage values begin to overwhelm management, the site can be placed on the "World Heritage in Danger" list, which often helps to attract international and national support for conservation of the site. "The list should not be seen as punishment," says Kokkonen, although it has been used as a way to encourage governments to take action against threats that are under their control. Some countries facing threats beyond their control have actually requested danger listings for their own sites to raise awareness on the need for conservation action and international support.

Meriwether Wilson, a World Heritage consultant on marine issues and commission member of the IUCN World Commission on Protected Areas (WCPA), says that because the World Heritage Convention is international in scope and legal stature, it offers a useful instrument through which countries can explore innovative approaches to MPA design and management. Take transboundary MPAs as an example, she says. Creating MPAs across national boundaries makes sense in light of the connectivity, multi-scale, and multi-site aspects of many marine community functions, like migration and larval dispersal. The World Heritage Convention encourages nomination of transboundary and serial (or multi-site) protected areas, offering a way for countries to approach cooperative management. "The dynamic nature of the marine environment lends itself particularly well to this kind of approach," says Wilson.

Building a strategy; more marine sites

Kokkonen and Wilson are working with Annie Hillary of the IUCN WCPA-Marine program to build a global network of marine World Heritage sites, as well as enhance UNESCO's marine conservation capacity and foster synergies across related conventions, like the UN Convention on the Law of the Sea. Their aim is to strengthen the World Heritage Marine Program over five years, including the establishment of new "pilot" marine World Heritage sites spanning a range of scales, environments, and socio-economic complexity. Three transboundary pilot sites are already underway, in the Central Pacific, the southeastern Caribbean, and the eastern tropical Pacific.

In early 2002, experts gathered in Hanoi, Viet Nam, to develop a list of coastal, marine, and small island ecosystems in tropical nations for potential nomination as World Heritage sites (*MPA News* 4:11). The workshop was convened by the World Heritage Centre in collaboration with IUCN and the US National Oceanic and Atmospheric Administration; the proceedings are available at http://whc.unesco.org/series/papers_04.pdf. A draft strategy for the World Heritage Marine Program calls for a similar workshop to be held

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to focus on potential nominees from temperate and polar regions.

Other goals of the World Heritage Marine Program include: (a) building a marine site managers network to share experience, training, and mentoring across World Heritage sites; (b) developing a user-friendly guide to World Heritage processes, including guidance for transboundary nominations; (c) conducting preliminary effectiveness assessments of existing marine sites on issues such as tourism, fisheries, coastal development, and science; and (d) identifying joint funding and partnership opportunities.

Notes & News

Re-zoning plan for Great Barrier Reef delivered to Australian Parliament

The enormous effort to re-zone the Great Barrier Reef Marine Park (*MPA News* 4:11 and 5:1) is now one step closer to completion. On December 3, Australian Environment Minister David Kemp delivered a zoning plan to the Australian Parliament, following approval of the plan by the Board of the Great Barrier Reef Marine Park Authority (GBRMPA). Parliament, if it chooses to do so, has until March 2004 to pass a resolution to disallow the plan; if there is no such motion, Kemp will set the date for the plan to come into effect, which could be as soon as mid-2004, according to government officials.

Tabling the zoning plan in Parliament was "another huge step forward," says Jon Day, director of conservation for GBRMPA. "But the plan is still not over the line."

Prepared by GBRMPA with extensive public consultation, the zoning plan would set aside 33% of the park as off-limits to all extractive activity, including commercial and recreational fishing. That percentage is roughly equal to what GBRMPA proposed in a draft zoning plan in June 2003. Following public comment on that draft, GBRMPA changed boundaries for many no-take areas ("green zones"), primarily to lessen their adverse impact. Currently, just 4.6% of the park is no-take.

Australian government ministers have agreed in principle to develop a "structural adjustment package" to help fishermen and other groups affected by the re-zoning. Details on this package will be determined as part of the implementation of the zoning plan.

Goals of GBRMPA in carrying out the re-zoning program have included maintaining biodiversity and ecological systems in the park and ensuring viable and sustainable industries that are dependent on the marine environment. A guiding principle was to set aside at least 20% of each of the park's 70 bioregions (30 reef habitats and 40 non-reef habitats) as green zones — which the zoning plan does. The green zones in the plan would total roughly 115,000 km^2, amounting to the largest network of no-take areas in the world.

The website for GBRMPA's Representative Areas Program (http://www.reefed.edu.au/rap) provides the zoning plan, zoning maps, a Regulatory Impact Statement (outlining the consultation process and impacts on various sectors), answers to frequently asked questions, and additional information. A Powerpoint presentation available on the website provides maps to indicate some of the significant changes in proposed green zone boundaries that occurred in response to public comment on the draft zoning plan.

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Report available on seamounts in NE Atlantic

A new report provides an assessment of seamount ecology in the Northeast Atlantic and an overview of current management experience on seamount ecosystems globally, including the use of MPAs. The report is a baseline study published within OASIS (Oceanic Seamounts: An Integrated Study), an interdisciplinary research project on Northeast Atlantic seamounts, funded by the European Commission. The 40-page publication *Seamounts of the North-East Atlantic* is available online in PDF format at http:// www.ngo.grida.no/wwfneap/Projects/Reports/Seamount_Report.pdf.

Although tens of thousands of seamounts exist worldwide, their biodiversity, ecology, and susceptibility to human impacts remain relatively unknown. Only a few have received protected status or are managed regarding exploitation of their natural resources, such as associated fish stocks. To receive a hard copy of the report, contact Stefanie Schmidt, WWF, International Marine Policy, Am Guetpohl 11, 28757 Bremen, Germany. Tel: +49 421 65846-28; E-mail: schmidt@wwf.de

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New report: guidelines for management plans

A new report published by the IUCN World Commission on Protected Areas provides protected area practitioners with a guide for setting management plans. *Guidelines for Management Planning of Protected Areas* offers a framework for readers to adapt to their needs and circumstances, guiding them through all phases of the planning process, from data collection to effectiveness assessment. Drawing upon best practices gathered from around the world, the report asserts the importance of involving stakeholders throughout the planning process. It is available in paper format from the IUCN Bookstore for US$22.50. For more information on the report and how to order it, go to http://www.iucn.org/bookstore/pro-areas-1.htm.

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