

Human Dimensions of MPAs: Facing the Challenges of Social Science and Its Implementation

The success or failure of a marine protected area often rests on socioeconomic considerations. Humans affect, and are affected by, the natural environment, and society must bear the benefits and costs of marine resource management. Without consideration of social and economic impacts, effective planning and management may be compromised.

However, despite the importance of MPA-related social science, relatively little research has been done on it — particularly when compared to the growing volume of research on the natural, or ecological, science of MPAs. Efforts are being made to change this. This month, MPA News examines how several practitioners and scientists are facing the challenges associated with generating and implementing social science.

Mediterranean: Planners avoid social science at MPAs' peril

According to Fabio Badalamenti, a biologist with Italy's National Research Council (*Consiglio Nazionale delle Ricerche*), the Mediterranean MPA community has been slow to recognize the significance of social science. The longer it delays, he says, the more it risks generating local opposition to MPA plans.

In a paper that he co-authored with nine other scientists for the journal *Environmental Conservation* ("Cultural and socio-economic impacts of Mediterranean marine protected areas", 2000, 27[2]: 110-125), Badalamenti reported that few data are available on the socioeconomic consequences of MPAs in the Mediterranean region. What data do exist are of limited use, and largely unpublished. "While many might regard the conservation of nature as the fundamental starting point," wrote Badalamenti's team, "neglecting the [cultural and economic] aspects can lead to only a partial comprehension of MPAs as a whole and often to poor local consensus, if not hostility." The lack of studies to justify MPAs from an economic point of view, they said, was a potential explanation for the slow pace at which Mediterranean MPAs have been established.

Not much has changed since 2000, says Badalamenti. Although he has given presentations on the subject and

tried to interest other researchers, most scientific interest in the field remains focused on biodiversity and the potential for marine reserves to help increase fish biomass, he said. The group that has expressed the most enthusiasm for his message has been small-scale fishermen. "This is probably due to the emphasis I put on the need to involve local residents, particularly fishermen, in planning, establishing, and managing MPAs," he said.

Granted, conducting rigorous social science on MPAs brings a set of obstacles that can make it challenging, says Badalamenti. Interviewing fishermen to learn about their resource use patterns and catches, for example, can be tricky. "Fishermen are very suspicious," he said. "You need to convince them that you will not use the data against them. You also have to convince them that an MPA is not just a series of prohibitions, but a chance for the future."

One positive development for him has been his recent involvement as an international consultant in the preparation of the Strategic Action Plan for the Conservation of Biological Diversity in the Mediterranean Region (SAP BIO — www.sapbio.net), overseen by the United Nations Environment Programme. One objective of this effort is to set a plan for the designation of specially protected areas in the Mediterranean, and Badalamenti said social science has been adopted as an important part of the initiative.

Nonetheless, progress elsewhere in the region remains slow. "Maybe it is still too early, and things will change in the future," said Badalamenti, remarking on the recent establishment of most European MPAs. "So far, non-Mediterranean scientists seem more interested in this topic."

US: A national social science strategy for MPAs

In the US, a project is underway to craft a national research strategy for MPA social science. The initiative, coordinated by the federally run National Marine Protected Areas Center, has three goals: highlight the nation's high-priority social science needs for funders

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Definition of social science

For the purposes of this article, MPA News has adopted a broad definition of MPA social science. While this includes the study of economic impacts, it also covers the cultural and institutional effects of MPAs, such as on community perceptions, resource-use patterns and governance. The term "socioeconomics" is used interchangeably with "social science".

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and agencies; identify potential areas of collaboration among scientists and practitioners; and provide a framework for incorporating social science in planning and management.

In April, the Center convened nearly 80 social scientists and practitioners to produce a broad list of gaps in the national knowledge base on MPA social science. The list covered basic questions along the line of *What do MPAs represent at the societal level?*, as well as applied ones (i.e., *How can MPAs be made to work better?*). The project leaders are now using the workshop results as a starting point for writing the social science research strategy.

Officials expect the strategy to be ready this fall. Afterward, a series of workshops will be held around the country to adapt the strategy to fit region-specific priorities, based on how each region uses, values, and is affected by its marine ecosystems. (Incidentally, the Center is also crafting a natural science research strategy for MPAs, due for release this fall as well.)

The Center's Charlie Wahle is overseeing the project. "Much of the current focus in the national MPA dialogue revolves around the potential economic effects — both positive and negative — of proposed MPAs," he said. "Consequently, the national research strategy will devote considerable attention to these complex issues. However, the social context for MPA planning and management is considerably broader than just economics, and that breadth and richness will be fully reflected in the research strategy." The April workshop separated attendees into six small groups, each addressing one social-science aspect of MPAs: i.e., use patterns, attitudes, governance, community organization, cultural heritage, and economics.

One recurrent theme in discussions involved the various challenges associated with generating social science. Apart from the lack of a prioritized research agenda, said Wahle, these challenges include the relatively small number of social scientists working directly on MPA issues and a scarcity of adequate funding. Generally, MPA-oriented research funds are directed toward the ecological side.

"The solution to the challenge of *using* what we do know from social science — or what we hope to learn soon — lies in developing ways to fully integrate social science perspectives into MPA planning processes," said Wahle. Such integration needs to be coupled with ways to allow practitioners to use social science in their day-to-day management, he said. Daily management often involves balancing the needs of multiple user groups, evaluating emerging threats and coping with a constantly changing, regional socioeconomic context. Each of these tasks can benefit from social science information.

Florida Keys: A manager's perspective on social science

An MPA manager should never underestimate the value of a socioeconomic assessment, says Billy Causey, superintendent of the Florida Keys National Marine Sanctuary (US). "It brings humans into the equation and recognizes them as part of the ecosystem that you're trying to manage," he said.

Social science forms a central part of his sanctuary's management and communications. Causey has worked to recruit and/or host several studies over the past half-decade, conducted by a mix of federal scientists and academics. One study has been a long-term initiative to monitor the socioeconomic impact on local fishermen of no-take reserves within the sanctuary: since reserve designation, the total value of catches in the sanctuary has increased while the total weight of commercial fishing landings — though declining somewhat — has not declined as much as in the state of Florida overall. Other researchers have examined the perceptions and attitudes of stakeholder groups on the new reserves, with conclusions on how sanctuary management could improve its outreach efforts to optimize communication with local citizens.

"It's important that managers understand not only the abundance and diversity of the natural resources in their area, but also the abundance and diversity of the social resources," said Causey. Because of the intensive public consultations necessitated by the sanctuary's reserve-planning efforts, his advice to other managers focuses largely on how to work with the community. "Understand your audience," said Causey. "It's not just the fishers. Your socioeconomic assessment should be broader than just the waterfront community and the folks making a living off the resources."

He advises that social scientists include the values and attitudes of citizens elsewhere, outside of the local community, who may hold strong feelings about the conservation of public resources in the MPA. In addition, he says, make sure stakeholders know they are being heard, and that their input is being used. And reach them with different communication styles and media. Fishermen, he points out, may not be able to attend public meetings, but they frequently listen to radio programming and can be informed via that medium.

Social science, of course, is about more than just how to reduce conflicts. Causey looks for factual information on people's activities in the sanctuary. "I want to know who's fishing where, what they're fishing for, and when," he said. As part of the sanctuary's Tortugas 2000 reserve-planning process, planners overlaid GIS maps of popular fishing sites with maps of habitat, at a scale of one square nautical mile (MPA News 1:1). The idea was that planners could set aside critical areas while minimizing impacts on the fishing community, thus

ensuring buy-in from stakeholders. "Our problems are so complex that we can't solve them without everyone working together," said Causey.

Canada: Studying socioeconomic prior to setting regulations

Under Canada's Oceans Act, the federal Department of Fisheries and Oceans (DFO) follows a multi-step process in the designation of marine protected areas. DFO first identifies a site as an Area of Interest, alerting stakeholders that the site is under consideration as a future MPA. Then, with stakeholder input, DFO decides whether to move forward with a management plan and a final, formal designation of the site as an MPA. To help inform the decisionmaking, the federal law requires DFO to conduct a socioeconomic assessment of the site.

The assessment must be done prior to the decision on whether to pursue formal MPA designation. Interestingly, however, it is required before even the drafting of a management plan. As a result, the assessment data end up focusing on the current value of the area and its resources, rather than on the societal impact of a potential, as-yet-unplanned MPA.

Jason Simms of DFO is overseeing what has been a four-year effort so far to designate an MPA in Gilbert Bay, in the province of Newfoundland and Labrador on Canada's Atlantic coast (<http://www.dfo-mpo.gc.ca/oceanscanada/newenglish/htindocs/mpas/gbay.htm>). Currently still an Area of Interest, the 60-km² bay appears destined for eventual designation as an MPA: there is strong local interest in protection for the bay, and an official steering committee of stakeholders has begun discussing what could be included in a management plan. Simms and other researchers produced a socioeconomic assessment of the site earlier this year to assist the committee.

"Unfortunately, we couldn't really assess a future MPA on the site because we're not yet at the stage where we have a management plan," said Simms. "We were able to lay out the value of the fishery in the bay, and the noneconomic value of the area to the Labrador Metis Nation [an aboriginal group whose members form a majority of local residents]. It was really more of an overview than an assessment."

Simms expects the report to serve as an important reference document in drafting the future management plan. When that draft plan is ready, as Simms expects it to be within a year from now, it is unclear whether DFO will follow up with a second assessment, based on expected social impacts of the MPA. "At that point we'll be able to make some socioeconomic projections of the effects of the MPA, but I don't know if those will be published or not," said Simms. "At some level,

Social science provides answers to array of questions

Carrie Pomeroy of the University of California at Santa Cruz (US) says that although social science on MPAs can sometimes be a challenge to generate, the roles it can play in studying and informing MPA processes are invaluable. A fisheries sociologist, Pomeroy has participated in high-profile MPA-planning processes in the past few years, including the effort to create no-take reserves within the Channel Islands National Marine Sanctuary (MPA News 2:10). In a presentation in June 2002 at the University of Washington, Pomeroy posed an array of questions that social science can help answer on the planning and management of MPAs. Below, MPA News offers an excerpt of that list:

Questions on attitudes, perceptions and beliefs:

- How do people perceive and value the marine environment, its use, and MPAs?
- Who supports and who opposes MPAs, and why?
- What do people expect of MPAs ecologically and socioeconomically, over the short and long terms?

Questions on use patterns:

- Who uses the marine environment in and near proposed MPAs — and how?
- What do resource users know about the resource and its use?
- How might resource users, groups, and communities adapt — and their use patterns change — with MPA designation?
- What are the socioeconomic implications, including distribution of costs and benefits, of the above changes?

Questions on governance and institutional structures:

- What entities have jurisdiction and authority in the area, and what bearing do these entities have on MPA processes?
- What formal and informal rules govern resource use?
- How might proposed MPAs interact with these formal and informal institutions?

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those projections will be in the final management plan, but there is no formal report that we are required to produce."

Gilbert Bay is a unique place, both ecologically and socially. It features a genetically distinct, resident population of Atlantic cod, notable for its reddish-brown color. The finding of this genetic distinction in 2000 has played an important role in galvanizing community support for the cod's protection. Meanwhile, the fact that the Labrador Metis Nation is not formally recognized as an aboriginal nation by Canada's federal government could add complexity to future regulatory negotiations regarding authority and jurisdiction in the bay.

Simms recognizes the importance of social science to his work. "The natural science will take care of itself," he said. "It's not the fish who are going to have a problem with being protected. It's the people who will have to deal with a certain amount of restrictions on their activity."

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Indonesia: Distinguishing the impacts of MPAs from other factors

When a community experiences social change following the local designation of an MPA, researchers must determine whether the change came because of the MPA or other factors. In the Indonesian province of North Sulawesi, researchers on a cooperative project to create a community-based marine sanctuary are facing that very challenge.

The project — made possible through the joint efforts of national, regional, and local Indonesian government entities, as well as the US Agency for International Development and the Coastal Resources Center of the University of Rhode Island (US) — has designated a no-take marine sanctuary near the village of Blongko, and aims to establish it as a best-practice model for other Indonesian coastal villages to follow. In addition to conservation, the objectives of the 0.12-km² sanctuary include economic benefits for local stakeholders and empowerment for the rural community in managing its resources. Blongko has roughly 1300 residents.

“A basic project premise is that coastal management initiatives will eventually lead to improved quality of life within the community as well as improved or stabilized environmental conditions,” said Johannes Tulungen, field program manager for the project. He has conducted baseline surveys and subsequent monitoring of the project and control sites to determine the effect of the new sanctuary on social and biological conditions. “However, socioeconomic changes are constantly occurring in any community,” he said. “Macroeconomic and large-scale ecological and political factors can often have major influences on socioeconomic conditions within any community, and may be greater than those due to project interventions. It is difficult to distinguish between impacts from project initiatives and these larger-scale changes unless there is time-series information and comparisons between project and non-project locations.”

Another challenge for social researchers: it may take years before a socioeconomic impact resulting from an

MPA becomes noticeable. “By monitoring socioeconomic changes periodically, we can start to learn how long it may take before such impacts can be measured using the indicators selected,” said Tulungen.

From when the sanctuary was designated five years ago, changes have been observed in the village. According to an interim assessment done in 2000, there has been a dramatic regional increase in population size with an annual growth rate of 8%, largely fueled by immigration from neighboring areas. In addition, fishing now outranks farming as the most important primary production activity among households. The resulting trend is a rise in fishing pressure region-wide, which appears to be unrelated to the sanctuary and outside of the village's control. Measurements of quality-of-life among villagers, however, have indicated some improvement over the course of the project, namely through increases in piped water supply and indoor toilets (facilitated in part by the project). But it is yet unclear whether the sanctuary played a role in this. “We cannot say that the establishment of the marine sanctuary has led to improved fish catches and incomes, which has then resulted in households improving their house structure,” said Tulungen.

What is clear, however, is that villagers' perceptions of the sanctuary and marine resources have changed since the start of the project. Blongko residents now view access to resources as being less of a problem than before the sanctuary existed, despite the fact that the MPA has banned fishing along part of their coast. Tulungen attributes this change to the community's increased control of its resources through the establishment of management committees and the preparation of a management plan. Furthermore, residents have informed researchers that they now find it easier to catch fish around the sanctuary compared to pre-sanctuary days. Upon completion of the project later this year, a final assessment will be done and management of the sanctuary will be completely transferred to the community. 📧

Notes & News

Reserves can help catches by preserving fish genetic diversity, says study

The designation of no-take marine reserves may be necessary for sustaining fishery yields over the long term, due to their ability to preserve genetic variation in the expression of fish size and growth rates, according to a study published in the 5 July 2002 issue of the journal *Science*. In their lab-based research on populations of Atlantic silversides (*Menidia menidia*), David Conover and Stephan Munch of the State University of New York at Stony Brook (US) wrote that their

selective harvest of larger fish — a strategy often employed in fisheries management through minimum-size restrictions — eventually resulted in a population of smaller, slower-growing individuals. It also brought a smaller overall yield, compared to other selective harvest strategies. The researchers argue that similar evolutionary forces are at work in the wild. Because fecundity increases with size, reserves may therefore be necessary to protect larger fish, thereby maintaining population productivity, they said. **For more information:** David Conover, Marine Sciences Research Center, State University of New York, Stony Brook, NY 11794-5000, USA. Tel: +1 631 632 8667; E-mail: dconover@notes.cc.sunysb.edu. 📧

MPA Perspective: MPAs Improve General Management, While Marine Reserves Ensure Conservation

By Bill Ballantine

The June "MPA Perspective" by Tundi Agardy (MPA News 3:11) is a carefully-argued and clearly sincere attempt to warn us about the problems that might arise if we set dangerous targets and adopt inflexible stances. Fortunately a little more attention to the basic assumptions shows that there is really no problem at all, other than that produced by confusing different methods and aims.

Dr. Agardy is absolutely correct when she states that MPAs cannot have a single definition or a single model; that MPAs can have a wide range of objectives and benefits; that they must be site-specific and hence flexible. There is only one fault in her argument, if it is a fault. She is not distinguishing between MPAs and marine reserves. Her understanding of the nature and purpose of MPAs is quite acceptable to reasonable people. But, except in timing, this equates MPAs with general marine planning and management. In her terms, MPAs are pieces of the sea to which we are at present giving more and better attention. There is nothing wrong with that. The sea is very large, we are very busy and cannot do everything at once. If we wish to label as MPAs the areas where we can now arrange more and better regulations, who can complain?

Such actions will spread and improve. Our capacity and willingness to plan and manage areas of the sea will steadily increase. The need to label as MPAs the places where we make special efforts will slowly diminish as more people accept that the sea, like the land, needs careful planning and management.

MPAs are about total management and its improvement. MPAs often have conservation as one of their objectives, but are more likely to have some particular aspects of conservation as defined aims that are seen to be locally important — along with many other worthy aims. This approach is important, useful and, indeed, inevitable.

But none of this alters the argument for fully-protected marine reserves. They are not concerned with general management as such. They aim to conserve (or restore) the full range of marine life and habitats in each region. This aim fits into sensible marine management, but it will not wait for any particular level of such management. Fully-protected reserves are needed now, and targets are entirely appropriate. How much general management is needed at present in any particular area is always arguable, and the answer will keep changing. But we must keep our options open and this means maintaining the basic components — especially the living components. This should not wait for problems to occur, and it should not list the species or threats. It

must be done on principle. It is perfectly reasonable to state that we need to set up a representative and sustainable network of marine reserves as soon as possible, and "sustainable" implies a target. This is entirely compatible with the steady development of flexibly-planned MPAs with a wide range of objectives. Just as MPAs will help with many aspects of conservation, fully-protected marine reserves will help with many aspects of general marine management. We do not need to worry about the fact that these are two different aims and that the methods for producing them will also be different.

We need MPAs where everything is carefully managed and we need marine reserves where the only management is to ensure things are left as undisturbed as possible. We do not need targets and defined stances on MPAs — just continuous adoption and improvement. We urgently need marine reserves with full protection (not flexible) and minimum targets so as to produce ecologically viable reserves and a sustainable system.

The nomenclature is not important, but the separation of the ideas is crucial. If you wish to call your MPA a multi-zoned and multi-use Marine Park and the fully-protected no-take areas Sanctuary Zones within the Park, I can see no objection — provided you make sure you get enough fully-protected areas. I note with great pleasure that the Great Barrier Reef Marine Park Authority has just announced its intention of substantially increasing the amount of "Green Zones", or no-take areas, in the Park. The present amount is 4.5% (MPA News 3:7).

In many countries it is argued that no-take marine reserves will provide benefits for fisheries, and as a biologist I think this very likely. But the details are not predictable in particular cases. So this (or any other resource management argument) should not be used as an aim for fully-protected areas. This does not matter. The conservation argument for marine reserves is predictable and undeniable; the fisheries and other socioeconomic benefits will be bonuses. 🇳🇿

Editor's note:

Bill Ballantine, author of the adjoining perspective piece, is a marine biologist and senior lecturer at the Leigh Marine Laboratory, University of Auckland. Ballantine has advocated the concept of no-take marine reserves since the 1960s, and has been instrumental in the designation of several reserves in New Zealand waters. He was awarded a Goldman Prize in 1996 for his grassroots efforts in support of marine reserves.

This perspective piece reflects to some extent the discussion of MPA definitions that has appeared recently in this newsletter (MPA News 3:7 and 3:8).

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For an updated calendar of more than 50 MPA-related conferences around the world, go to www.mpanews.org

Notes & News

Victoria passes MPA legislation

In June, the Australian state of Victoria passed legislation to designate a representative system of no-take MPAs covering roughly 5% of the state's waters. The system will include 13 marine national parks and 11 smaller marine sanctuaries, to take effect November 2002.

The legislation marked the culmination of a 10-year process of investigations and public comment on the issue (MPA News 3:1). Government officials said the new system's representative nature, size, and biodiversity established Victoria as a global leader in marine conservation. "This is a world-first environmental initiative," said Acting Premier John Thwaites.

Included in the system is a compensation scheme for fishermen affected by the new closures: financial

assistance will be available to fishery-license holders to cover increased operating costs and reduced catches directly related to the no-take areas (MPA News 3:11). The scheme is a revision of one offered by the government last year, which was blocked by the parliamentary opposition for capping the amount of compensation to be made available. The cap was removed in this year's bill. Changes to the compensation arrangement — paired with amendments to the proposed boundaries of several parks — helped secure final parliamentary support.

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Canada designates fishery closure to protect deepwater corals

In June, the Canadian Department of Fisheries and Oceans (DFO) designated a 424-km² area of Georges Bank off Canada's Atlantic coast as a "coral conservation closure", in which gillnetting and bottom-trawling are banned. The move is intended to protect the area's sensitive deepwater coral habitat from disturbance.

Fishing for groundfish by longline — the gear that has, more often than not, been used in the area in recent decades — will be restricted to a popular fishing site that comprises 10% of the closure. DFO will place observer personnel on most of the longliners in this fished area to monitor the gear's effects on coral.

Leslie Burke, regional director of fisheries management with DFO, said this and related research will help inform the department's long-term strategy on protecting coral. As DFO learns more about coral and its protection, he said, the closure's coordinates and regulatory conditions could change. "The boundaries could grow, or some fishing could be allowed back in if studies show it is safe," he said.

Due to strong and variable currents and rocky substrate, much of the closure's coral-rich area is difficult to fish using any gear, according to Martin Willison, a professor of biology at Dalhousie University (Canada) who has championed the protection of Canadian corals for several years. Nonetheless, Willison suspects that at some sites within the closure, corals have been removed by fishing activity. "I am pleased that the closure includes these damaged areas because it may make it possible to observe recovery of coral communities," he said. Willison said he was disappointed that the plan, as designed, will demonstrate only the impacts of longlining gear; he would prefer to see intensive observer coverage included for the trawlers and gillnetters operating immediately outside the conservation area. But he called the closure "a good first step" for coral protection.

Deepwater corals typically live between 100 and 2000 meters below the sea surface, in temperatures of 4-12°C. With much of their biology and ecology still unknown to scientists, deepwater corals are the focus of increasing study and conservation efforts around the world (MPA News 3:5).

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From the Editor

Dear Reader:

This issue marks the third anniversary of MPA News. Launched in 1999, the newsletter now has subscribers in 75 countries around the world. On behalf of the staff and editorial board of MPA News, I want to thank you for the positive support and word-of-mouth that has enabled MPA News to grow as it has.

As I wrote in our first issue, MPA News exists to serve the entire MPA community by informing people and bringing them together. The community is a broad one — site managers, fishermen, environmentalists, scientists, etc. — with diverse experiences and philosophies. Although such diversity can sometimes engender disagreement, it also offers the basis for informed MPA planning and effective management.

In the past year, various articles from MPA News have been reprinted in fishing-trade and diving-oriented publications. This is a good sign. Communication among all stakeholders holds the key to improving our understanding of MPAs' strengths, weaknesses, and possibilities. MPA News will continue to do its part to keep the communication flowing.

In the meantime, please continue to let us know how we're doing, and how we can serve you better. Thank you very much. I look forward to hearing from you.



John B. Davis
Editor