

Paper Parks: Why They Happen, and What Can Be Done to Change Them

Many marine protected areas exist on maps and in legislation but offer little real protection in the water. Often referred to as “paper parks”, these sites represent a failure of efforts to protect resources and ecosystems. They are surprisingly common. Estimates of the percentage of some countries’ MPAs that exist primarily on paper range as high as 80-90%.

Reasons abound for this ineffectiveness, and often center around shortages of funding, lack of community support, and other factors. Although these conditions can be persistent, practitioners around the world are working to overcome them. This month, MPA News examines some of the causes of paper parks and how people and organizations are working to turn them into effective MPAs.

Management effectiveness

The term “paper park” was defined in a 1999 report, *Conversion of Papers Parks to Effective Management: Developing a Target*, as:

“A legally established protected area where experts believe current protection activities are insufficient to halt degradation.”

Produced for a terrestrial initiative — the WWF-World Bank Alliance for Forest Conservation and Sustainable Use — the report set a global target of converting 500,000 sq. km of threatened and under-managed forest protected areas to effectively managed protected areas by 2005. (The report is available online at <http://www.iucn.org/themes/forests/protectedareas/ThreatstoForestProtectedAreas.pdf>)

That goal illustrates the main point of the report: that is, paper parks occur when there is ineffective management. If management could be made more effective — primarily through identifying and addressing the threats that face each protected area — then paper parks would be changed into effective parks. “The immediate threats to...protected areas are in turn the result of several underlying causes,” writes the report. “Understanding the nature and importance of these causes is essential for effective action to reduce the problems.”

Marc Hockings agrees. Co-chair of the Management Effectiveness Task Force of the IUCN World Commission on Protected Areas, Hockings says it is essential for practitioners to address both the causes of threats and the capacity of managers to respond to them. “I think we have known for many years that most protected area systems are under-resourced, but it is only recently that we have started to get some better measures of the extent of this lack of resources,” he said. “Management effectiveness assessment can help, both in identifying threats and in assessing the adequacy of resources to respond to those threats and other management needs.”

Hockings co-authored a report for the IUCN on how to measure management effectiveness, recommending a flexible framework for evaluating design issues, appropriateness of management systems, and delivery of protected area objectives (see box, above right). In the final analysis, he says, the last factor — whether the site is achieving its objectives — is the true test of management effectiveness.

That test can be challenging. In the Philippines, for example, of the more than 400 MPAs that have been legislated there since 1980, only about 10% of them are actually achieving their objective of habitat protection, says Alan White, a geographer with the Coastal Resource Management Project of the Philippines’ Department of Environment and Natural Resources. The 10% figure is based on field observations. This lack of success is due to, among other things, a lack of management guidance and evaluation, he says.

Book on measuring management effectiveness available online

Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas, by Marc Hockings, Sue Stolton and Nigel Dudley, is available for free online at:

<http://wcpa.iucn.org/pubs/publications.html>

A separate report, also by Hockings, offers quick reviews of 28 systems used worldwide for measuring management effectiveness, primarily for terrestrial protected areas. This review is available for free online at:

<http://www.nrsm.uq.edu.au/Nrsm/Research/Methodologies.pdf>

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Paper parks

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To provide such evaluation, White is helping lead a project to develop a rating system for existing MPAs in the Philippines. Implemented primarily by the Sulu Fund for Marine Conservation Foundation (Philippines) with support from the Pew Charitable Trusts (US), the Marine Protected Areas Project will provide ratings useful to local governments in determining how their MPAs are performing compared to others nationwide, says White. In addition, the ratings will educate communities and MPA managers about what they are doing correctly or incorrectly. "It may also create a bit of competition among MPA managers to improve what they are doing," he said.

The system will factor the age of an MPA in its rating. MPAs in their first or second year of existence will be rated on criteria that reflect the preliminary steps of initiating an MPA, while older MPAs will be ranked on various aspects of establishment, enforcement, and operations.

Another objective of the project will be to quantify coral reef resource uses, values, and benefits in the context of MPA implementation. Without community recognition of the nonconsumptive economic value of reef ecosystems, says White, MPAs as a management tool will be unreliable. Knowing the value of reefs is critical for educating communities and encouraging government and donor investment in coral reef MPAs, he says.

Lack of appreciation for MPAs

Lida Pet-Soede studied the paper park phenomenon in Indonesia as part of her doctoral thesis on factors affecting how closed areas are perceived by fishers and authorities. Now serving as fisheries program manager for the WWF Wallacea program in Indonesia, she estimates that fewer than 20% of marine parks in Indonesia are functional. She says a lack of interest in MPAs — among both locals and fisheries officers — has posed a real problem. "This is a result, in my view, of different perceptions of 1) the value of the area for different purposes, and 2) the threats to the area," said Pet-Soede.

Managers in charge of enforcing MPA regulations in Indonesia often do not appreciate the seriousness of that responsibility, she said. For management of no-take MPAs to be successful, she says, managers and fishers must first believe that stock decline is a problem and that there is a relationship between fishing effort and stock decline. Such belief has not been widespread, she says.

"In Indonesia at different administrative levels, fisheries officers using the official fisheries statistics data feel they have no reason to worry about collapsing fish stocks,

because the data show increasing catches over time," she said. In fact, she says, those increased catches are due to advances in fishing technology and greater distances traveled by fishers, and disguise the fact that fish stocks are declining. Nonetheless, the perception that fish stocks are not in danger of collapse leads managers to downplay the importance of strictly enforcing MPA regulations.

She says there is also little information on the scale and extent of the use of destructive fishing practices in Indonesia. "Only recently have estimates of the economic value of a reef been presented where the long-term benefits and losses are taken into account," she said. "Managers and authorities have so far only considered estimates of direct benefits from fishing, and have therefore allowed certain practices to continue unregulated. Once it is clear that there are large economic incentives in the long term to protect an area, authorities might be inclined to distribute their budgets differently toward patrol and control."

But, ironically, it is that promise of economic benefits from MPAs that may pose the biggest challenge to securing long-term local support for closed areas, said Pet-Soede. "It seems that the objective [in designating MPAs] now is to provide opportunities to communities to increase their catches around park borders and increase income from park-related tourism activities," she said. Engaging communities in MPA planning is vital, she said, but it has resulted sometimes in MPAs that reflect compromises rather than ecologically sound choices. "The risk now is that when anticipated benefits are not realized (no increases in catches, etc.), people lose interest in supporting the implementation," she said.

Pet-Soede wonders whether it would be appropriate to remove MPA designation for some sites that show little chance of achieving real protection. "Although it may appear a 'loss of face', it makes little sense in terms of efficiency to continue efforts for some parks when you are only further dividing scarce funds and manpower," she said.

Factors for success

Richard Pollnac has studied the factors that influence the success of community-based MPAs. An anthropologist with the Coastal Resources Center of the University of Rhode Island (US), Pollnac focused his study on 45 MPAs in one region (Visayas) of the Philippines. He selected the Philippines because of its extensive experience with, and large number of, community-based MPAs.

Pollnac measured the success of each MPA using several criteria, among them coral health, degree of adherence to rules, community empowerment to manage resources, and MPA features (i.e., marker buoys, management plan, monitoring program, etc.). He then

calculated the correlation between the above measures of success and various environmental, demographic, and other factors.

What he found were five variables that appeared to be the most critical to the overall success of community-based MPAs:

- a relatively small population size
- a perceived crisis in terms of reduced fish populations before the MPA project
- successful alternative income projects
- a relatively high level of community participation in decision making (high on the democracy scale)
- continuing advice from the (internal or external) organization that initiated implementation of the MPA

At sites exhibiting positive values for only one or two of the above variables, Pollnac found no successful MPAs. In contrast, MPAs with positive values for all five variables exhibited a 100% success rate. (MPAs with positive values for just three or four of the variables could still be successful: they exhibited success rates of 33% and 69%, respectively.)

Because his study was limited to community-based MPAs in one region of a single country, Pollnac has cautioned against generalizing his results beyond the Visayas region. However, he notes that the factors he studied were not selected in a vacuum. "A lot of the variables that I tested were ones that people had already suggested in case studies from various places around the world," he said. "I think there's a likelihood that if you tested the same variables elsewhere, they would be related to success there as well."

Pollnac would like for his research to help improve the success rate of community-based MPAs. In the Philippines, he said, the success rate could presumably rise to 80% as stakeholders learn to implement MPAs more effectively. It is unlikely it would ever reach 100%, though. "Of course, there will always be some that fail, because there are so many reasons that an MPA can result in failure," he said.

Efforts to improve MPA effectiveness

Lack of enforcement is often cited as a reason for protected-area failure. Unless there is completely voluntary compliance with an MPA's regulations — a rare occurrence — there is a need for some sort of policing.

Upon its designation in January 2000, the no-take Port Honduras Marine Reserve (Belize) was ripe for violations by fishers. Although supported in concept by a majority of attendees at its planning meetings, the reserve was a poacher's paradise. The 837-sq. km, 133-island reserve was large and hard to patrol, and its management body — the Toledo Institute for Develop-

ment and Environment (TIDE) — was a small NGO with limited resources. To make matters worse, there were no demarcation buoys, so even well-meaning fishers had trouble telling where the reserve began. Fishers from neighboring countries were reportedly responsible for much of the poaching, though the tradition of fishing the area was strong for local fishers, too.

TIDE did not wait long to make improvements. This year, with a grant from Seacology, a US foundation, TIDE built a ranger station on an island in the heart of the reserve, with a tower that allows views of the key areas. In just a few months, the station has already had an impact. According to Lindsay Garbutt of TIDE, the number of patrols is up, encroachment is down, and fuel consumption by rangers has been cut by 35%. The rangers — former fishers and hunters — are working harder now on-site than before the station. And the station's presence demonstrates TIDE's long-term commitment to the area, said Garbutt.

But enforcement alone is not enough, he says. TIDE is also working with small-scale and artisanal fishers to develop economic alternatives for them, including in the growing ecotourism industry. To date, TIDE has trained 50 former fishers and hunters to serve as tourism brokers in flyfishing, kayaking, scuba diving, snorkeling, and other activities.

Changing people's minds about the importance of protection can be just as important as enforcement. Several hundred miles to the west of Belize, the five main islands that form the Netherlands Antilles have experienced a diversity of benefits and challenges from their MPAs. Ranging from MPAs serving as an important economic engine through dive tourism (i.e., Bonaire and Saba), to MPAs as a much lower-profile endeavor (Curaçao), the islands have each gone their own way.

Paul Hoetjes, of the nation's Department of Public Health and Environment, says Curaçao has traditionally been an island focused on trade and industry. "Although

Paper MPAs are everywhere

Although the adjoining article cites examples of paper parks in various developing nations, ineffective MPAs exist in developed countries, too. There are countless examples of paper MPAs around the world, in rich nations and poor.

In the US, as just one example, Everglades National Park in Florida has faced several decades of unabated population growth in the region and an entrenched agricultural base that has drained the wetland-based park of much of its water, transforming the ecosystem. The future looks promising, however. Efforts to restore the ecosystem culminated last year in the launch of a 40-year, US \$7.8-billion dollar federal program to improve water quality, storage, and flow in the park.

For more information on the Everglades restoration, go to:

Website of the Everglades restoration plan
<http://www.evergladesplan.org>

Website of Everglades National Park
<http://www.nps.gov/ever/>

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dive tourism has been growing since 1985 and is bringing in a substantial part of total tourism revenue, public and especially political support still tend to go to big business — large scale development, industry, the harbor,” he said. Researchers have documented the sedimentation of reefs inside Curaçao Underwater Park caused by shoreline development.

Menno van der Velde, president of Reef Care Curaçao, a local NGO, points out that although the island pays a yearly subsidy to help manage the Curaçao Underwater Park, no legislation has actually been passed to establish and protect it, aside from Curaçao’s general bans on spearfishing, breaking off of corals, and disturbing sea turtles. “We sort of have the reverse of a paper park: a park that is being managed but does not in fact exist,” he said.

Over the years, tight funds and the lack of legislation have frustrated the park’s management, says van der Velde. Patrolling of the park became more and more perfunctory, and no alternate funding sources were pursued. The situation culminated this year in the firing of the park’s last ranger due to general cutbacks in the park’s management organization, National Parks Foundation Curaçao. Although the manager of the park is still employed, he is primarily occupied by other work for the foundation, said van der Velde.

In light of these challenges, beginning in 1996, Reef Care Curaçao began mobilizing other NGOs, agencies, and businesses involved with coral reefs in the Netherlands Antilles to work together for the benefit of the nation’s reefs and MPAs. In February 2001, this effort resulted in a workshop, organized by the national environment agency, to draft an action plan for preserving the nation’s reefs. The multistakeholder meeting launched the Netherlands Antilles Coral Reef Initiative (NACRI), whose list of priorities include training of MPA staff and stakeholders and a media campaign to communicate “the importance of MPAs” to the Netherlands Antilles.


Such importance is often measured in economic value, and the perceived economic value of the reef in Curaçao is relatively low, said Hoetjes. NACRI aims to change this. “[Economic value] is what the public responds to,” said Hoetjes. “The intrinsic value of the reef — the idea that it should be preserved even if it has no economic value at all, just because it is beautiful and unique — as yet does not carry much weight with most people here.” 

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Tortugas Ecological Reserve to Take Effect

The 518-sq. km Tortugas Ecological Reserve, located at the western end of the Florida Keys National Marine Sanctuary (US), will take full effect on July 1, 2001. Located in two parts (Tortugas North and Tortugas South), the coral-rich reserve will be off-limits to all fishing. Diving will be prohibited in Tortugas South. According to sanctuary officials, the reserve will be the nation’s largest permanent no-take marine reserve.

The process to create the ecological reserve involved a wide array of stakeholders, including several federal agencies, state government, divers, fishers, and scientists (MPA News 1:1). The US Department of the Interior — which oversees nearby Dry Tortugas National Park and which participated in the reserve-planning process — is still considering creating a no-take “research natural area” of its own that would abut Tortugas North. 

Canada to Designate MPA for Hydrothermal Vents

On June 8, the federal cabinet of the Canadian government approved a plan to designate the Endeavour Hydrothermal Vents as an official marine protected area under Canada's Oceans Act. The highly biodiverse area has been of great interest to scientists since its discovery in the 1980s, and its MPA status will serve mainly to ensure that its ecosystem remains relatively undisturbed for scientific study. This represents one of the first efforts in the world to establish an MPA specifically for the protection of hydrothermal vents.

The Endeavour vents lie at a depth of 2,250 meters, 250 km southwest of Vancouver Island on Canada's Pacific coast. The protected area, consisting of four known vent fields, will cover roughly 93 sq. km and stretch from the sea floor up to sea level.

Canada's Department of Fisheries and Oceans (DFO) selected the Endeavour Hydrothermal Vents in 1998 as one of several "pilot MPAs", part of a strategy to evaluate whether the areas should be formally designated as MPAs and how they could be best managed (MPA News 1:1). Race Rocks, a small nine-island archipelago on the southernmost end of the nation's Pacific coast, was the first pilot MPA chosen for full MPA designation under the Oceans Act, in September 2000 (MPA News 2:4).

Now that the Endeavour vents have received cabinet endorsement as an MPA, they will undergo a regulatory process to formalize the MPA designation. That process is expected to conclude by August 2001, according to Doug Andrie of DFO.

Zoning the MPA

As part of the Juan de Fuca Ridge system, the Endeavour vents are in an active seafloor-spreading zone where tectonic plates diverge and new oceanic crust is extruded onto the seafloor. In these zones, cold sea water percolates downward through the crust where it is heated by the underlying molten lava, eventually jetting back up through the seafloor as plumes of particle-rich, superheated fluid. The plumes of the four known vent fields shoot about 300 meters into the water column.


The vents are distinctive for their "black smokers" — large, chimney-like structures that form when dissolved minerals and metals carried upward by the plumes precipitate on contact with cold water. Venting systems such as these host some of the highest diversity and abundance of microbes on earth, living off the chemical energy of the emerging fluids. The Endeavour vents are also home to large tube worms, crabs, and spiders.

Currently, the depth of the Endeavour vents and their distance from the mainland limits access to those with

the technological equipment, ability, and resources to reach the area. The proposed MPA is not greatly affected by fishing activity, which is minimal in the area and mostly focuses on highly migratory species (tuna). The principal anthropogenic impact facing the ecosystem comes from extraction of samples for research, including chunks of the black smokers.

To balance the objectives of research and protection, the management plan for the proposed MPA has established a zoning system. Each of the four vent fields will be managed to allow particular activities. In the two fields that have already experienced the most research activity, sampling of the smokers will continue to be permitted, while the other two fields will harbor stricter restraints on research activity. One site in particular will be managed as a control site for examining the effects of human activities elsewhere in the vent system, with only water-sampling and mapping allowed. All research activity in the MPA will require a permit from the Canadian government.

Interestingly, hydrothermal vents have a tendency to "move", disappearing from some spots and appearing in others as a result of ongoing seafloor processes. This means the vents could conceivably move out of the protected area at some point. DFO's Andrie said this was a consideration in the planning process. "We'd like to manage [the MPA] in an adaptive manner, which could involve adjusting the boundaries if necessary," he said.

Most of the ideas in the management plan came from work performed by a multistakeholder planning team, which included representation from federal departments and academic institutions. Future management of the MPA will be executed through a management committee, chaired by DFO and involving federal departments, Canadian and foreign scientists, the Canadian private sector, educators, and an NGO. 

Proposed Endeavour regs online

The proposed regulations for governing the Endeavour Hydrothermal Vents MPA are published in the Canadian government's *Canada Gazette*, at

<http://canada.gc.ca/gazette/part1/pdf/g1-13523.pdf>

Note: The PDF file that corresponds with this address contains a significant amount of information on other government regulations unrelated to Endeavour. For the section on Endeavour, go to pp. 70-83 of the PDF document (corresponding to pp. 1940-1953 of the *Canada Gazette*).

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More Responses on the State of MPA Science

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In last month's MPA News, we surveyed scientists for their opinion on what recent research had done the most to improve general understanding of the science of MPAs. We asked them a single question: What has been the most noteworthy contribution to the science of marine protected areas in the past 3 years, and why?

MPA News printed three responses last month, and is printing two more at right:


Craig Dahlgren, Science Director, Perry Institute for Marine Science/Caribbean Marine Research Center, Bahamas

"There have been two major contributions to the science of marine protected areas in the last three years. The first has been the increase in modeling studies that have examined the effect of marine reserves on fisheries outside of their boundaries, and the various circumstances under which marine reserves can support or enhance fisheries yields. These modeling studies will provide the basis for the continued creation of marine reserves for fisheries management and will guide much empirical research over the next 3+ years.

"Similarly, another major contribution has been studies examining factors that influence larval dispersal from marine reserves. While it is well documented that marine reserves can increase spawning stock biomass (SSB) of exploited species, we are only beginning to understand how this increase in SSB is transferred to protected and unprotected areas by larval dispersal. Models and empirical studies have begun to change the way that we think about populations of marine species and how marine reserves may affect these populations, both inside reserves and outside reserves in fished areas. Improved understanding of how marine reserves replenish themselves, each other, and fished areas is essential to understanding how marine reserves function and how they may be used as a management tool." 

David Dow, NE Regional Recreational Fisheries Coordinator, Nat'l Marine Fisheries Service, USA

"Even though there is a lot of evidence for the role of MPAs in increasing the diversity and abundance of benthic invertebrates and demersal fish of limited mobility, the role of MPAs in helping facilitate the recovery of depleted groundfish stocks in a wider system has not been as well-documented.

"The recovery of yellowtail flounder (*Limanda ferrugineus*) and haddock (*Melanogrammus aeglefinus*) populations on Georges Bank as a result of a large-scale closure (17,000 sq. km) to groundfishing seems to be a good example of benefit to the wider ecosystem. This success story was augmented by the recovery of sea scallop (*Placopecten magellanicus*) populations within the closed areas, which have since been re-opened to harvesting. This has been described in: 'Large-scale closed areas as a fishery management tool in temperate marine systems: the Georges Bank example' by Steven A. Murawski *et al.* which appeared in *Bull. Mar. Sci.* 66:775-798 (2000)." 

[Editor's note: The limited re-opening of these closures to scalloping was profiled in MPA News 2:3.]

High-tech solutions to scientific data needs

MPA News reported last month on the challenges facing practitioners in accessing science. Following up, here are two new high-tech projects that promise some help to MPA practitioners in Africa and the US:

The **Ocean Data and Information Network for Africa** project, or ODINAFRICA, aims to provide a comprehensive "one-stop shop" for the continent's oceanographic and marine-resource information, using the project website (<http://odinafrica.org>) launched in May 2001. The website's products and services include scientific journal articles, a database of African ocean publications, and a directory of African ocean experts, and will soon offer a metadatabase of ocean datasets available on the continent. Supported by the government of Flanders (Belgium) and the Intergovernmental Oceanographic Commission of UNESCO, the ODINAFRICA project involves 20 African coastal states.

Mika Odido, an ODINAFRICA regional coordinator, said the project will cover biological parameters as well as physical. Already a marine species database for Eastern Africa has been developed within the project framework.

In the US, the National Oceanic and Atmospheric Administration (NOAA) has teamed with other governmental agencies and academic organizations to develop an automated coral reef monitoring system that will eventually be deployed throughout the nation's coral reef areas. Currently under testing on a reef in the Bahamas, the **Coral Reef Early Warning System**, or CREWS, was developed in response to the US Coral Reef Task Force Monitoring Group's recommendation to monitor all major US coral reefs by 2007.

The CREWS stations will serve several purposes, including modeling conditions thought to be conducive to coral bleaching, and serving as a testing station for other instruments useful in monitoring coral reef ecosystem dynamics. The system will produce automated e-mail alerts when conditions are thought to be conducive to bleaching. CREWS could eventually be extended to monitor parameters for such biological phenomena as the spawning and migration of fish and invertebrates. For an introductory guide to CREWS, visit http://www.coral.noaa.gov/crw/crews_layman.pdf.

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