

Urban MPAs: Protecting Marine Habitats in the Midst of Human Populations

For many people, the term “marine protected area” evokes the idea of a pristine ecosystem, remote from human activities. The image of a city waterfront might not come to mind. However, MPAs can perform important functions near urban centers — serving as recreational sites, for example, or as protective zones for remaining patches of undisturbed habitat, among other purposes.

Such urban MPAs bring their own set of challenges. Coastal development, shipping activity, and large numbers of diverse stakeholders are just some of the factors to be faced during planning and management. This month, *MPA News* examines cases of urban MPAs around the world and how practitioners are addressing these challenges.

Establishing community-based MPAs in a large community: Lapu Lapu City (Philippines)

A project underway in the Philippines is working to determine how best to manage MPAs in urban settings. The project area, the city of Lapu Lapu, is within the second largest urban area in the nation: Cebu City, home to 2 million people and a thriving coastal tourism and diving industry. The project seeks to help local communities in Lapu Lapu define and establish a sustainable, city-wide MPA management framework. Lessons from that process will then be disseminated to other coastal urban areas in the region and nationwide.

Managed by the Philippine-based Coastal Dynamics Foundation along with the city government of Lapu Lapu and other partners, the project will build upon lessons learned from what is considered the first urban MPA in the Philippines. That MPA — the no-take Gilutongan Marine Sanctuary, formally established and enforced since 1998 — is just outside the Lapu Lapu project area. In Lapu Lapu itself, the concept of MPAs is still relatively new: its first marine protected area was designated in 2000. Since then, two more have been added and four are in advanced stages of designation. Each is planned and managed by a local coastal community, or “barangay”, within the city. The project is working with barangays and the city to coordinate efforts, including on education, capacity-building, and site-monitoring programs.

“On a global scale, the project area may represent some of the most accessible, high diversity coral reefs in the world,” says Mike Ross of the Coastal Dynamics Foundation. The waters of Lapu Lapu contain about 10-20 km² of reef habitat in fair condition. Protecting that reef may be somewhat more complicated than it would be in a more remote area, says Ross. One reason: the major sources of income for local communities are city-based, so the typical barangay is not closely connected to its adjacent reef areas, aside from fishing there on days-off or as a secondary or tertiary livelihood. Rather than rely on an argument that protecting the reef will ensure sustainable catches over the long term, says Ross, other economic motivation becomes necessary. “For urban MPAs, the emphasis may need to be placed on the economic benefits to come to the community from sustainable recreational use of the reefs, such as from managed diving and coastal tourism,” he says.

The financial benefits from MPAs in the region can be significant. The nearby Gilutongan Marine Sanctuary collects nearly US\$40,000 annually from diver fees, of which 50% goes to the local barangay to support MPA operations (the rest goes to the municipal government). If indirect economic benefits from that MPA are tallied, its total revenue generated for the community and local government is roughly US\$200,000 per year. Local vendors, for example, are allowed to sell their wares at the MPA on a rotational basis, which builds community support for the site and adds additional “eyes” to help with enforcing MPA regulations during daytime.

Pollution and urban MPAs

A significant challenge for urban MPAs is pollution. Sewage and industrial effluent, as well as storm water runoff containing sediment, fertilizers, pesticides, and other pollutants, can place a major strain on nearby protected areas. In February 2002, *MPA News* described how various urban and non-urban MPAs were handling the issue of water quality (*MPA News* 3:7).

Addressing the pollution threat often involves cooperating with other management authorities onshore. Australia’s Great Barrier Reef Marine Park Authority, for example, worked with federal and state agencies, industry, NGOs, and the general public to develop the Reef Water Quality Protection Plan, released in October 2003. The plan covers several urban areas and 26 major river catchments adjacent to the Great Barrier Reef Marine Park. For an overview of the water-quality challenges facing the Great Barrier Reef and to download the protection plan, go to http://www.gbrmpa.gov.au/corp_site/key_issues/water_quality/index.html.

Table of Contents

Urban MPAs: Protecting Marine Habitats in the Midst of Human Populations	1
Notes & News	3
Agreement to Protect <i>Titanic</i> Provides Model for High-Seas MPAs	4
Panel Releases Consensus Statement on Reserves as Fisheries Management Tool	5
Notes & News	5
Letter to the Editor	6

continued on next page

Accessibility and economic potential

In tourism, says Mike Ross of the Philippine-based Coastal Dynamics Foundation, accessibility is key, and being near a city provides that accessibility. "The closer an MPA is to tourists, the greater its economic potential," he says. "Tourist stays are growing shorter. For them, time is money. In addition, closeness adds value for other potential users such as swimmers, snorkelers, and newer divers who may not be as interested in traveling to more remote sites." With user fees, he points out, the more users, the more revenue.

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Concurrently, the attraction of the well-managed MPA has enhanced the local tourism and diving industry, increasing employment and income in this sector.

Alan White of the Coastal Conservation and Education Foundation (CCEF), a Philippine NGO that is also involved with MPAs in the area, says, "The benefit of an MPA's proximity to an urban area is that once the MPA is set up and enforced, it can collect user fees that are significant and can cover the cost of management." Notably, like the Gilutongan MPA, the MPAs being designated in Lapu Lapu are no-take but allow diving; the project is working to establish uniform user fee systems. If well-managed and enforced, the new MPAs should help reduce some of the current diver pressure on Gilutongan while increasing opportunities for enhanced economic and environmental benefits to the local communities. (Ross says that in the process of creating these MPAs, local resorts and dive operators need to be recognized as concerned stakeholders and involved as community members.)

This is not to say that planning and managing these MPAs is easy. "In cities like Lapu Lapu City, the challenges that are not present in more rural areas revolve around the number and sophistication of stakeholders," says White. "There is industry; there is a dense urban population that creates lots of waste; there are large tourist investments that promote jet skis alongside of swimming and snorkeling; and there are traditional fishers and illegal fishers mixed in who are trying to defend their traditional lifestyle. In short, it is a bit of a mess, and requires much more vigorous methods of community-level work with well-trained community organizers than in more rural areas where values are less mixed."

Protecting against coastal development: Queensland's Fish Habitat Areas

In the Australian state of Queensland, the state is using a type of MPA to protect specifically against the effects of coastal development on important underwater habitats. Called "Fish Habitat Areas" or FHAs, these inshore and estuarine sites allow certain community uses like fishing and boating to occur. However, any activities requiring the disturbance of habitats within that FHA — including the building or maintenance of docks, bridges, pipelines, moorings, or other structures — are either prohibited or require special authorization, depending on site regulations. Direct discharge into FHA waters is prohibited, and any coastal development must include a vegetated buffer of at least 100 meters in width.

In use by the state since the late 1960s, FHAs are designated and managed by the state Department of Primary Industries – Fisheries (DPI Fisheries). The FHA program has over 70 sites, covering more than 7500 km² of tidal and subtidal fish habitats. Several FHAs are adjacent to urban areas, including the Gold Coast and the cities of Cairns and Townsville.

Concessions can be made in FHA designation, says John Beumer, who oversees the FHA program. If a development requires vessel access through an FHA, for example, the proponent may be required to cede to the state other lands with equivalent fish habitat values in return for that access. Developers can also formally challenge the state to revoke portions of an established FHA, thus allowing development to proceed in the area. Beumer points out, though, that fewer than 10 such revocations of small areas within existing FHAs have occurred in the past 35 years. "Proposals for revocation usually involve a major development, such as an export mineral sand loading jetty," he says. "A number of these have led to revocation but the development has failed to proceed, and the revoked lands have been re-declared as part of the FHA at a later date."

By the nature of their purpose, FHAs enjoy significant backing from the Queensland public, says Beumer. "Fishing and boating are key pastimes in Queensland, and the objective of using FHAs to protect fish habitats from development while still permitting all legal forms of fishing has strong public and political support," he says. Where there are violations of an FHA, such as illegal moorings, DPI Fisheries works with the violators and other government agencies to forge a solution, such as locating a common mooring site outside the FHA boundary.

In considering whether to designate a new FHA, DPI Fisheries considers several criteria related to habitat, fisheries, and existing and planned uses of the site. Where identified prior to designation, active development nodes may be given a small foreshore exclusion to allow for limited future development; in some cases, a proposed FHA may even be removed from further consideration. DPI Fisheries undertakes extensive community and stakeholder consultation in FHA planning, a process that can last up to three years, depending on the complexity of the issues involved. Beumer notes that designation of the state's urban FHAs "fortunately" occurred prior to the mid-1980s, before coastal development in Queensland accelerated and DPI Fisheries had 200 development proposals on file. "Declaration of such urban areas now is more challenging given the long consultation process necessary and the need to accommodate existing pressures," he says.

Protecting remaining habitat: San Francisco Bay National Estuarine Research Reserve (US)

San Francisco Bay in the US state of California once supported nearly 770 km² of highly productive tidal marsh. Today, just 65 km² remain, thanks to widespread development of coastline in a region that includes the city of San Francisco. Of the remaining portion, 15 km² of the highest quality remaining wetland and adjacent habitat is included in the San Francisco Bay National Estuarine Research Reserve (SF Bay NERR), designated in 2003. Collectively this

habitat — comprised of two non-adjacent sites — serves as a reference against which enhanced, restored, or created wetlands in the region can be evaluated. No extractive activity is allowed in the reserve without a research permit.


SF Bay NERR is one of 26 NERR sites nationwide. The NERR system is a partnership between coastal states and the National Oceanic and Atmospheric Administration (NOAA) to protect estuaries and provide coastal decisionmakers with up-to-date scientific information, generated by research at each site. In the case of SF Bay NERR, the California state parks agency owns and manages one site (“China Camp”) while a private land trust owns and manages the other (“Rush Ranch”). San Francisco State University serves as lead agency and headquarters for the reserve. NOAA provides 70% of the reserve’s funding.

Original plans for the protected area involved up to 11 different sites and five different land management agencies. “One of the goals of the NERR program is to have the designated reserve represent the diversity of an estuary,” says Mike Vasey of San Francisco State University, who served as acting reserve manager during the reserve’s planning phase. In retrospect, he says, the attempt to incorporate sites throughout the bay was overly ambitious. Over time, two potential partner agencies withdrew to focus on other projects, leaving the reserve planners with three sites eligible for designation: China Camp, Rush Ranch, and Browns Island —

the third being the largest and least disturbed remnant of tidal marshland in the area.

At this point, the reserve’s urban location became an issue. For ships to get to the nearby city of Stockton, they must pass Browns Island. The Port of Stockton, which purchased part of the island in the 1920s to serve as a dredge disposal site, has in recent years announced its intent to widen and deepen a channel that separates Browns Island from shore. The widening could potentially involve removal of part of the island. If the land were included in the NERR, the port was concerned the protected status could restrict its dredging plan, despite assurances to the contrary from state and federal permitting agencies.

“This was a totally unexpected complication,” says Vasey. The port, using its leverage as a landowner and its political influence at the federal level, had Browns Island removed from consideration.

Vasey says, “The ironic part of this story is that, of the eleven proposed components, the two with which we ended up are really the two best sites for the reserve in terms of accessibility, landscape representativeness, and already existing programs that we can build on. Throughout these challenges, we maintained a level of persistence, optimism, and adaptiveness. There was never a question that the region really needed to have a NERR present.” As the reserve becomes more established over time, he says, its partnering agencies will likely devote resources to acquisition of additional sites. 

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Notes & News

Two new reports available on coral monitoring

Managers of coral reef MPAs may benefit from two new reports that provide methods for monitoring reef health. The first, *Methods for Ecological Monitoring of Coral Reefs*, published by the Australian Institute of Marine Science (AIMS), provides a comprehensive guide to methods for monitoring all aspects of coral reef ecology, arranged according to subject of study (benthic communities, fishes, physical parameters, etc.). The report also offers advice on establishing a monitoring program and lists several regional programs already in existence, with contact information. It is available online in PDF format at <http://www.aims.gov.au/pages/facilities/bookshop/monitoring-methods/monitoring-methods.html>.

The second report, *A Global Protocol for Assessment and Monitoring of Coral Bleaching*, provides a set of procedures for studying key aspects of coral bleaching events. Designed for use by people with differing levels of experience and resources, the report aims to help researchers and managers document bleaching events, determine factors that increase susceptibility to bleaching, and understand how management may help reefs be more resilient. By standardizing the monitoring of bleaching events, say the authors, there will be better documentation of global and smaller-scale patterns, which can aid management. The report was published by Worldfish Center and WWF Indonesia. It is available online in PDF format on the ReefBase website at <http://www.reefbase.org>. (To access the report, you will need to subscribe to ReefBase, which is free; directions are on the website.)

Catholic bishops declare Great Barrier Reef sacred

The Great Barrier Reef is sacred and any willful harm done to it constitutes a diminishment of God, according to a statement released in August by the seven Catholic bishops of the Australian state of Queensland. The statement highlights the unique nature of the reef and the threats it faces, as well as some of the work being done to preserve it. In particular, the bishops commend recently concluded efforts to re-zone the Great Barrier Reef Marine Park with expanded no-take zones (*MPA News* 5:10).

“Care for the environment and a keener ecological awareness have become key moral issues for the Christian conscience,” write the bishops. Their statement, titled “Let the Many Coastlands Be Glad!”, says that greenhouse gas emissions, overfishing, some reef-based tourism, poorly planned development, and coastal runoff all compromise the health of the reef. To obtain the 26-page statement, known as a pastoral letter, e-mail Col Brown, CEO of Catholic Earthcare Australia, at colbrown@speedlink.com.au.

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Agreement to Protect *Titanic* Provides Model for High-Seas MPAs

A new international agreement to protect the wreck of the *Titanic* from destructive activities has now been signed by two parties: the US, which signed it in June 2004, and the UK, which signed in 2003. Under the accord, parties will regulate activities such as research and salvage that may disturb or harm the wreck site. The agreement will take effect once both parties enact implementing legislation — that is, once their national legislative bodies agree to be obligated by the accord.

The UK enacted such legislation last year; the US has not yet done so. Only those nations that sign and agree to be obligated by the agreement will have to abide it.

The accord relies largely upon jurisdictions already recognized under the UN Law of the Sea Convention, such as a nation's jurisdiction over its citizens and vessels under its registry. "This agreement has been accomplished without asserting jurisdiction over the wreck itself as property or as a resource of the continental shelf," says Ole Varmer, a lead member of the US delegation that negotiated the agreement with the UK, Canada, and France. (These are considered the four nations most closely associated with *Titanic* by the fact that it is a British-flagged vessel, jointly discovered in 1985 by a French-US expedition in waters off Canada's east coast. France and Canada have not yet signed the agreement or enacted implementing legislation.)

Varmer says the *Titanic* accord may be "a very good model" for international cooperation regarding activities directed at natural features, such as deep-sea vents located in international waters. The wreck, located approximately 325 nautical miles off Canada, is well outside any nation's jurisdiction over underwater cultural heritage. Under negotiation since 1997, the agreement designates the wreck site as an international maritime memorial.


The *Titanic* hit an iceberg and sank in 1912, killing nearly 1500 individuals and coming to rest 3600 meters below sea level. Since the wreck's discovery in 1985, it has been subject to a mix of salvage operations, and has also been negatively impacted by filming and tourism activities. A 2004 expedition found significant recent damage had occurred to the wreck.

"Creeping coastal state jurisdiction"

There is no specific international framework for designating high-seas MPAs that would apply automatically to all nations, although a multitude of international agreements either offer some direct authority to manage

resources outside national jurisdiction or provide elements that could be helpful in establishing high-seas MPAs. (See *MPA News* 5:4 for a discussion of high-seas MPAs.) Absent such a specific framework, the next-best option lies in bilateral or multilateral agreements such as this *Titanic* accord. To be effective, such agreements must have enough signatories to establish *de facto* global MPAs, recognized by at least those nations whose vessels and nationals have the ability to access the sites in question. Varmer says he hopes that Russia and Japan, which have the technical capacity to access the *Titanic* wreck, will respect the agreement and eventually become parties to it.

He says parties to the negotiations were concerned about the possibility of "creeping coastal state jurisdiction" occurring as part of the agreement, and sought to avoid that. It is in the interest of the US, UK, France and other maritime powers, he says, to ensure that no nation's protection of underwater cultural heritage, like the *Titanic*, is used to assert new rights that could have potential political domino effects — such as, hypothetically, a nation extending its exclusive economic zone or territorial sea out to a wreck and declaring authority to manage underwater cultural heritage within that area. Although such novel moves could establish strong protection for the wreck, they would also destabilize the balance of interests that have been agreed upon in the Law of the Sea Convention (LOSC). Negotiators also had to ensure the agreement addressed LOSC rights to fishing, navigation, and the laying of cables and pipeline.

The *Titanic* accord states a preference for *in situ* preservation of the wreck, from which more than 6000 artifacts have already been brought to the surface and either displayed or auctioned. It forbids piercing of the hull for salvage purposes but allows licensed salvage from the wreck's debris field, under a new system for documenting salvaged items. 

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Titanic agreement available online

The international
agreement to protect the
wreck of the *Titanic* is
available online at [http://
www.state.gov/goes/rls/orl/
2004/33709.htm](http://www.state.gov/goes/rls/orl/2004/33709.htm).

Correction: Komandorsky Zapovednik, Russia's largest MPA, was designated in 1993, not 1992 as described in the August 2004 issue of *MPA News*. Its new director, who was mentioned in the issue but not named, is Nikolay Pavlov.

Panel Releases Consensus Statement on Reserves as Fisheries Management Tool

A seven-member panel of US scientists and policy experts has released a consensus statement on the effects of no-take marine reserves, their usefulness in fisheries management in the US, and how they may be designed, monitored, and evaluated. The statement also addresses sources of uncertainty associated with marine reserves, and recommends areas for further study. It is available online at <http://www.nfcc-fisheries.org/consensus>.


Among the conclusions of the panel is that “knowledge is sufficient to proceed with the design and evaluation of reserves for the purposes of addressing primary fishery management goals.” However the panel says that further experiments designed explicitly to study reserve effects on fisheries are “urgently needed”, and that important uncertainties remain for nearly all aspects of reserve planning and implementation.

Convened in June 2004 by the National Fisheries Conservation Center (a NGO), the panel was part of a two-day conference to examine several reserve-related questions, and was aided by input from modelers, ecologists, fishermen, and others. The panel consisted of individuals not currently engaged in research or advocacy in the field of marine reserves. Past issues of *MPA News* have demonstrated disputes among biologists and fisheries scientists over the limits of reserve science and the effectiveness of reserves for fisheries management (*MPA News* 5:6 and 5:7).

Reserves as precautionary tool

The panel’s findings generally parallel those of past US efforts to forge consensus on marine reserve science. A report by an expert committee of the National Research

Council in 2000, for example, also called upon fisheries managers to incorporate reserves as a supplement to conventional management tools, and identified future avenues of research (*MPA News* 2:5). In 2001, more than 100 marine-science academics recommended that marine resource managers use reserves as a “central management tool” for achieving fishery and conservation benefits (*MPA News* 2:8).

Notably, the NFCC panel asserts that reserves are not necessarily more “precautionary” than other management tools, strictly in terms of fishery management. “Many authors have speculated that marine reserves offer more precaution (insurance) against management and scientific uncertainty than do traditional measures,” the panel writes. “At this point, this is an assertion and no studies using common definitions and metrics of precaution have been conducted.” However, taking a broader set of factors into account — such as stabilizing trophic structure or preserving biodiversity — may tip the weighted risks and benefits in favor of utilizing a reserve, states the panel. 

Book available on use of MPAs in fisheries management

For more views on the use of MPAs — and particularly no-take marine reserves — in fisheries management, a new book from the American Fisheries Society (AFS) offers a collection of research papers on the subject that were presented at the August 2003 AFS annual meeting in Quebec City (Canada). The 301-page *Aquatic Protected Areas as Fisheries Management Tools* provides 27 papers on aspects ranging from MPA design to monitoring to economic aspects, as well as several case studies. It also includes summary materials, an MPA bibliography, and a list of useful websites on MPAs.

The book costs US\$60 and can be purchased from AFS. For more information or to order the book, go to <http://64.224.98.53/publications/catbooks/x54042.shtml>.

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Notes & News

Report provides lessons learned on involving stakeholders

Several broadly applicable lessons on stakeholder involvement in MPA planning can be learned from efforts to designate MPAs in the US in the past decade, according to a new report released by the National MPA Center (US). The report provides six case studies — representing diverse geographic areas and an array of social, political, and ecological complexity — and analyzes them for patterns in what made each designation process effective or ineffective. Those patterns serve as the basis for a dozen general recommendations provided by the report authors.

Included among the recommendations are the following, excerpted by *MPA News*:

- **On politics:** Planners and managers should treat politics as the natural expression of human and interest

group dynamics that reflect stakeholders’ genuine interests and perceptions. They are part of the policy process and need to be recognized, accommodated, and planned for. Such interest group dynamics often lead to conflict, which should be seen as a natural part of such complex processes.

- **On the role of scientists:** Process managers need to remember that scientists are people, with motivations and biases like other stakeholders. Scientists should not work separately from other stakeholders, even on seemingly non-controversial issues. Scientists should be selected to ensure that their skills match the areas of expertise defined by the objectives of the process, and their role made clear to stakeholders.
- **On involvement of key staff:** Upper level managers and agency decisionmakers must ensure that key program staff are formally assigned to manage the process from start to finish, and that they have the experience, stature, and core skills needed to understand and influence its evolution, and to successfully flag and negotiate emerging issues with the program leadership.

In addition to providing broad lessons common to all six designation efforts, the report distills additional insights from each of the individual cases. It is available online in PDF format at http://mpa.gov/information_tools/lessons_learned_table.html.

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MPA Figures

Number of MPAs worldwide that include areas of:

Coral reef	660
Seagrass	354
Estuary	242
Mangrove	237
Seamount	84

Source: *Sea Around Us* project, a partnership between the Fisheries Centre of the University of British Columbia (Canada) and the Pew Charitable Trusts. These data were gathered from analyses of several global databases. *Sea Around Us* is undertaking a global assessment of marine protected areas, in collaboration with World Wildlife Fund (WWF), the UNEP-World Conservation Monitoring Centre (UNEP-WCMC), and IUCN World Commission on Protected Areas-Marine (IUCN-WCPA). The project seeks to develop a robust global MPA baseline by improving current estimates of marine area and habitat coverage of MPAs as indicated by the World Database of Protected Areas, maintained by UNEP-WCMC.

For more information

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Rating system available for MPA management in Philippines

A system designed to rate the management effectiveness of individual MPAs in the Philippines is now available as part of a project to improve the nation's MPA governance. The "MPA Report Guide and Rating System", released in June 2004, allows MPA managers to assess the status of management and the local ecosystem through a relatively simple survey. Completed ratings are then entered to a nationwide database, which will be used to compare ratings among sites and develop lessons learned for improving management.

"The goal is for all legally declared MPAs in the Philippines to be part of this rating system," says Alan White of the Coastal Conservation and Education Foundation (CCEF), the Philippine NGO that oversees the project. (The project is supported by the Philippine government together with more than 20 institutional partners. Original funding came from the Pew Fellows Program in Marine Conservation.) White says that although the system was developed for the Philippines, its basic structure could be adapted as a model for similar systems elsewhere.

The rating system covers five phases of implementation — from initiation through institutionalization. It awards points for criteria or activities that have been addressed by management. Points are earned, for example, for having conducted a baseline ecosystem assessment prior to designation, or for reviewing and updating a management plan.

Letter to the Editor

Dear MPA News:

The piece by Peter Kareiva on lessons from terrestrial conservation (*MPA News* 6:1) fails to explicitly state that its focus is biodiversity conservation, rather than some other target such as wilderness or recreational value, as pointed out in Brad Barr's letter in response (6:2). It is also unfortunate that Kareiva incorrectly characterizes the biodiversity hotspots strategy as one of "accumulation of long lists of species within the smallest possible area". In fact, biodiversity hotspots are identified on the basis of high endemism — they are highly irreplaceable regions with large numbers of species found nowhere else. Within these global priority regions, conservation will always require "maintenance of critical ecological processes".

More perceptively, Kareiva correctly notes the enormous similarities between marine and terrestrial conservation, and identifies the opportunity for marine conservationists to learn from the past successes and failures of their terrestrial colleagues. As a global terrestrial gap analysis showed last year, despite many years of effort and some remarkable achievements, the

CCEF has released two versions of the rating system, one for municipal or city-managed MPAs and one for nationally declared sites. The criteria vary between the two systems due to differences in designation, management bodies, and other factors. Explaining the need for separate systems, White says, "When the questions are too generic, they are more difficult for local managers to understand." The rating system is available online at <http://www.coast.ph>. Click "Projects", then "The Marine Protected Area Project".

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California resumes MPA planning process

The state of California (US) is re-starting a program to create a system of MPAs throughout its waters. Temporarily halted by officials in January 2004 due to a shortfall in state funds and staff (*MPA News* 5:7), the program will be supported by US\$2 million provided by private donors, as well as \$500,000 in state funds. The donors include the David and Lucile Packard Foundation, the Gordon and Betty Moore Foundation, and the Homeland Foundation. The new MPAs will be off-limits to commercial fishing, although some could allow recreational fishing, according to state officials. An overview of the planning process is available online at <http://www.dfg.ca.gov/mrd/mlpa/overview.html>.

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current protected area system still falls significantly short of representing all species. As on land, biodiversity conservation goals can be best reached in the marine realm by prioritizing conservation of areas of high irreplaceability and threat, and ensuring — within these — action at a scale significant enough to capture ecological processes.

Lastly, we applaud Kareiva's point on the need to avoid simply following the path of least political resistance when siting MPAs. Facing up to the challenges of conservation in regions of high conflict is critical when these areas also hold irreplaceable biodiversity. While most conservation will always be local, globally flexible biodiversity conservation resources must move away from "snow and rock", and their marine equivalents, and prioritize regions where we will soon lose species that we can never bring back.

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