MPA news

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Creating MPA Inventories: How Canada and the US Are Meeting the Challenge

As MPAs are designated around the world, keeping track of their locations and what they're protecting becomes increasingly necessary. In order for resource managers to analyze the breadth or effectiveness of a collection of MPAs, they need to know what is already in place.

This is easier said than done. In regions where MPAs have been designated under a variety of regulatory regimes, tracking down all of them can be a painstaking process. Even defining what is meant by "marine protected area" – and, therefore, what will be included in the inventory – can be tricky. This month, MPA News examines efforts by two countries to create national MPA inventories, and describes how they are facing the challenges involved.

Canada: Integrating MPAs and oceans management

Peter Hale, along with Canada's Department of Fisheries and Oceans (DFO), has created what he sees as the tool of the future for planning Canada's coastal and marine environment. Featuring an online GIS database, the Oceans Program Activity Tracking (OPAT) System provides visitors with information on a range of government activities: from MPAs, to integrated coastal management projects, to marine environmental quality initiatives (see box, right). OPAT displays each project's geographic location, and provides additional project-related information in text, video and other formats.

Hale is coordinator of the Integrated Coastal Zone Management program for DFO. The OPAT System, he says, was designed to demonstrate how the three programs of Canada's Oceans Act – MPAs, integrated coastal management, and marine environmental quality – relate to one another.

Hale says the system's MPA inventory aspect is enhanced by the information on other ocean management activities. In essence, it mirrors the way that integrated coastal and ocean management is carried out. "If you simply establish an MPA but don't manage the surrounding area with that MPA in mind, the MPA could fail," he said.

So far, the MPA inventory displays a subset of the nation's federal-level marine protected areas. Hale hopes to incorporate other federal and provincial MPAs in the near future. "Our goal is to provide consistency in reporting MPAs no matter where they may be," he said. For each MPA, OPAT provides a standardized report with 20 categories of information, including ecozone, objectives, key issues, participating stakeholders, and contact information. MPA site managers are responsible for reporting the information and updating it on a regular basis, which minimizes the workload of the OPAT project team.

The OPAT team has faced some challenges, including making the online tool fully bilingual (English/French) – a requirement of the Canadian government. Some site managers are not bilingual, requiring the translation of their site information. Hale said it has also been a challenge to design the tool to be as easy to use as possible, both for visitors to the website and for site managers. "It was designed by users for users," he said. "So far, it's worked."

The time required to take OPAT from its concept stage to a working online system was just four months, says Hale. The secret: another federal department – Natural Resources Canada – had already developed the applicable technology for its own purposes. Building OPAT has required just five people, including one programmer, and cost less than CDN $200,000 (US $130,000). Now, Hale says OPAT could be adapted to fit the needs of other nations, should they be interested.

"What you see now is an early version," said Hale. "Ultimately, I'd like OPAT to be used for the planning of any activity affecting Canada's coastal and marine waters: urbanization, agricultural activities, shipping, natural resource extraction, etc."

US: Building an accessible inventory

In May 2000, former US President Bill Clinton signed an executive order (EO) to establish a national network of marine protected areas. Among its requirements, the EO ordered the US Departments of Commerce and the

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Canada's OPAT System

To interact with Canada's Oceans Program Activity Tracking (OPAT) System, go to:

http://www.dfo-mpo.gc.ca/canoceans/

The website explains how to download the special software (MapGuide) necessary to view OPAT.

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Univ. of Washington

Patrick Christie, Ph.D.
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Univ. of Washington

Michael Murray
Channel Islands Nat'l
Marine Sanctuary

Direct correspondence to: MPA News, School of Marine Affairs, Univ. of Washington, 3707 Brooklyn Ave. NE, Seattle, WA 98105, USA. Tel: +1 206 685 1582; Fax: +1 206 543 1417; E-mail: *mpanews@u.washington.edu.*

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Interior to publish and maintain a list of MPAs. The development of a national MPA inventory is now underway.

Dan Farrow of the National Oceanic and Atmospheric Administration (NOAA), within the Department of Commerce, is the NOAA lead on the project. He says that a fundamental principle in building the MPA inventory is to make it as open and accessible to the public as possible. "Regardless of whether you support MPAs or have concerns," he said, "access to a comprehensive, accurate, and up-to-date inventory is an essential prerequisite for a fair and factual dialogue about how best to protect our marine resources."

The website *www.mpa.gov*, co-managed by the Departments of Commerce and the Interior, profiles the progress of the MPA inventory project. As of mid-August 2001, more than 250 federal and federal/state partnership sites were listed, including 36 federal fishery management areas. Each listing includes information in several categories: type of site, managing agency, legal basis, and others, as well as links to the relevant regulatory code and the MPA's official website. The database is searchable. Farrow hopes that all federal MPAs will be inventoried by early 2002.

The next step will be to add state and territorial MPAs to the list. Farrow estimates that each coastal state and territory in the US has 50-100 MPAs of its own. Added up, that totals 1800-3600 state and territorial MPAs across the country.

Inventorying those sites will be a big job, and the project will depend on state and territorial managers to supply and update the information. The project team has developed a standardized data-collection survey – featuring a set of more than 40 data types – to assist managers in reporting at all levels (federal, state, territory, and, eventually, tribal and local). For this reporting system to work, says Farrow, it will be key to identify the incentives. "Unless you can show a program the benefits of initially providing, and then keeping timely, the information in the inventory, it is very difficult to compile and keep current this kind of comprehensive database," he said. The biggest benefit of participation, he says, will be the ability for managers to compare their MPAs with other states' and have ready access to a wealth of information on these sites.

One challenge that the project has faced is one encountered by all MPA inventory initiatives: developing a set of criteria for deciding which sites to add to the inventory. The interagency inventory team wrestled with a number of questions, including:

- Should the inventory include estuary sites, and, if so, how far upstream may they extend?
- Under what conditions do protected intertidal areas constitute an MPA?
- How should sites that were designated for other purposes, but which provide significant conservation value, be treated?

Are fishery closures MPAs?

Canada's OPAT System does not include temporal fishery closures in its MPA inventory. "We don't consider them to be marine protected areas," said OPAT creator Peter Hale. One of the reasons is consistency. If OPAT included temporal fishery closures, he says, it would have to include other temporal closures, too, such as oil and gas moratoria. Canada's entire Pacific coast is currently subject to federal and provincial moratoria on oil and gas development.

Josh Laughren, marine program director for WWF Canada, an NGO, says fishery closures shouldn't be included because they don't offer permanent protection. To be an MPA, he says, a site must offer long-term, legislated preservation of habitat. "A fishery closure can be changed or removed by bureaucratic order – it can be here today and gone tomorrow," said Laughren. "That's not to say that closures aren't an effective fisheries management measure. But calling them an MPA is a misnomer." He points out that most every part of the Canadian coastline is subject to some management regime prohibiting some sort of fishery activity at some time of year.

The US MPA inventory, under development by the Departments of Commerce and the Interior, does include some fishery closures. To be in the inventory, closures must provide year-round protection, and must be established with an expectation of – or at least the potential for – permanence. The inventory does not include areas subject to emergency closures, sites set aside to avoid gear conflicts, nor areas subject to single-species management measures that do not benefit a broader array of species or habitats.

For more information

Peter Hale, Marine Ecosystem Conservation Branch, Oceans Directorate, Fisheries and Oceans Canada, 200 Kent Street, Ottawa, Ontario K1A 0E6, Canada. Tel: +1 613 990 0308; E-mail: *HaleP@dfo-mpo.gc.ca.*

Josh Laughren, WWF Canada, 245 Eglinton Ave. East, Suite 410, Toronto, ON M4P 3J1, Canada. Tel: +1 416 489 4567 x263; E-mail: *jlaughren@ wwfcanada.org.*

The working criteria developed by the team in answer to these questions (and more) are online at *http://mpa.gov:80/mpaservices/building_inv/sup1_define.html*. As with most features of the MPA inventory project, the working criteria are open to public comment, which can be submitted via the website.

In September 2001, the *www.mpa.gov* site will be revamped to include such features as clickable zoom maps to show details of individual sites, and a more robust summary of features of each listed MPA. Down the road, Farrow says, the inventory will be linked with other coastal management issues and data layers, similar to the Canadian project. "There are some key data layers that everyone is interested in – biological, physical, and land-based location data – and we are working to make these available to combine with the inventory data," he said.

For more information

Peter Hale, Marine Ecosystem Conservation Branch, Oceans Directorate, Oceans Sector, Fisheries and Oceans Canada, 200 Kent Street, Ottawa, Ontario K1A 0E6, Canada. Tel: +1 613 990 0308; E-mail: *HaleP@dfo-mpo.gc.ca*.

Dan Farrow, National Ocean Service, NOAA, 1305 East-West Hwy., Silver Spring, MD 20910-3282, USA. Tel: +1 301 713 3000 x156; E-mail: *dan.farrow@noaa.gov*.

IUCN's global MPA inventory to be updated

Plans are underway to give the four-volume IUCN report *A Global Representative System of Marine Protected Areas* a thorough update. Published in 1995, the report is the first and only global inventory of MPAs. Its second edition will be a collaboration of the UNEP World Conservation Monitoring Centre, the IUCN World Commission on Protected Areas, regional and local experts, and the US National Oceanic and Atmospheric Administration.

The updating process could take several years, says Bud Ehler, vice-chair (marine) of the World Commission on Protected Areas. It will focus attention on several elements, including the gathering of boundary information for GIS analysis and the incorporation of management-effectiveness information.

The products will include paper-copy reports and an internet-based database, an electronic mapping tool, reporting capability, and MPA assessment tools. "We are now trying to raise the substantial funds required to undertake this project," said Ehler.

The 1995 report was edited by Graeme Kelleher, Chris Bleakley, and Sue Wells. It identified sites of national and regional priority for the conservation of marine biodiversity in 18 regions around the world. In total, it counted 1306 MPAs.

For more information

Bud Ehler, International Ocean Service, NOAA/ National Ocean Service, 1305 East-West Highway, room 13442, Silver Spring, MD 20910, USA. Tel: +1 301 713 3080 x159; E-mail: *charles.ehler@noaa.gov*.

Tips on creating an MPA inventory

Deborah McArdle created what has perhaps been the most influential MPA inventory in the US to date. Her 1997 report *California Marine Protected Areas*, published by the California Sea Grant College System, demonstrated the complex and fragmented nature of the state's MPA system. The report provided a basis for legislative efforts to make the system more coherent, culminating in the passage of the Marine Life Protection Act by the California legislature in 1999 (MPA News 1:3). This law requires, among other measures, the recommendation of a master plan to steer the design of existing and future MPAs.

McArdle has since counseled other MPA inventory efforts in the US and Canada. She offered MPA News the following tips:

- Start with a clear definition of what you consider an MPA to be, and stick with it.
- Include the relevant legal code reference for each MPA in the inventory – this way, stakeholders who need to access the code can gain it easily. This is useful for regulators who are interested in amending the code, and for other stakeholders interested in refreshing their knowledge of regulations.
- In cases of conflicting regulations, get the highest-ranking official in the relevant agency to decide which regulation supersedes which. Lower-level officials may give contradictory answers.
- Be confident. In creating an MPA inventory, you will be interpreting the law to some extent, and you will need to defend your interpretation in public.

For more information

Deborah McArdle, University of California Cooperative Extension, 305 Camino del Remedio, Santa Barbara, CA 93110, USA. Tel: +1 805 692 1734; E-mail: *damcardle@ ucdavis.edu.*

Revisiting High-Seas MPAs: A New Report, and Results of a Workshop

Approximately half of the Earth's surface consists of the high seas: open-ocean and deep-sea ecosystems beyond the 200-nautical-mile marine jurisdiction of any coastal state. Under the United Nations Convention on the Law of the Sea (UNCLOS), nations hold a duty to protect the marine environment and to conserve the living resources of the high seas.

But the high seas are also open to all nations, and subject to freedoms of fishing and navigation. For such activities to be limited, multilateral agreements are necessary. Such agreements are binding upon their signatory nations, but not upon others.

While there are several multilateral environmental and conservation agreements dealing with the high seas, few establish MPAs as such. Last year, MPA News (2:1) reported on various activities by scientists and governments to support the designation of MPAs in international waters. New information is now available.

New report on high-seas resources

To this point in time, there has been relatively little international attention paid to the subject of high-seas MPAs. This may be due, in part, to the fact that fishing on the high seas accounts for a relatively small fraction of global fishing activity. Also, until very recently, little was known scientifically or commercially about open-ocean and deep-sea ecosystems, including hydrothermal vents and seamounts.

A new report commissioned by WWF (an international NGO) and IUCN (World Conservation Union) suggests that the current growth and improved technological capacity of some industries – including demersal fishing – pose potential threats to the deep sea. *The Status of Natural Resources on the High Seas: An Environmental Perspective* identifies high-seas areas of particular scientific, social or economic interest, and considers their value as MPAs.

The report strongly encourages the designation of MPAs around seamounts. These steep-sided, undersea mountains are estimated to exist in the tens of thousands around the world, although the precise location of many of them is not yet known. The upwelling around their edges can support biodiverse communities: over 70 species of commercially valuable fish, shellfish, and corals have variously been found around seamounts. The distribution of many seamount species appears to be highly localized.

These sites have experienced a recent surge in interest from the fishing industry as inshore fish stocks have been depleted. In the Indian Ocean, the discovery of orange roughy on seamounts has led to a boom in that fishery. The limiting factor to this exploitation has been the general lack of knowledge of seamount location.

"Sacrificial" seamounts

Any international effort to create high-seas MPAs around seamounts will encounter a challenge similarly faced in almost all international agreements, says Charlotte de Fontaubert of IUCN, a co-author of the WWF/IUCN report. That is, only the signatories to the agreement must abide by it.

"It is clear that, in the short term at least, only a handful of [nations] will abide by the MPAs that they alone will recognize around the seamounts," says de Fontaubert. "As a result, a number of seamounts will necessarily be 'sacrificed' by being identified as an MPA, where only the fishermen of the [nations willing to forego fishing there] will be excluded. For the rest of the fishing fleet, this will be a red flag, pointing to an area where the resources are worthy of protection, meaning that they are also valuable."

De Fontaubert says delegates of countries likely to participate in any future seamount-protection scheme, including Australia, have told her that the pioneer MPAs will not be around the most valuable seamounts, since it is anticipated that the first seamount MPAs will be severely impacted by non-complying nations. "In other words, everyone realizes that there will be a very high short-term price to pay in terms of the state of the resources, but this is pretty much unavoidable," she said.

Workshop on high-seas MPAs

The applicability of high-seas MPAs was the point of debate at an international workshop held in March 2001 in Vilm, Germany. Funded primarily by the German government, the workshop convened experts on international law, nature conservation, and marine ecology. Some participants advocated the use of MPAs for the protection of a range of high-seas ecosystems and species. Others questioned the appropriateness of the tool, suggesting that MPAs on the high seas could be viewed as having an occupational character; that character would seemingly contradict the freedoms of the high seas under international law.

WWF/IUCN report available

Co-authored by Charlotte de Fontaubert, of IUCN, and the Deepseas Benthic Biology Group of Southampton Oceanography Centre (UK), the report *The Status of Natural Resources on the High Seas: An Environmental Perspective* is available online at:

http://www.panda.org/resources/publications/water/highseas.pdf

Bernard Oxman, a law professor at the University of Miami (US), says that MPAs, if applied to high-seas resource management, should be used carefully. Attempting to apply the same MPA tool to a wide range of high-seas conservation issues – from seamounts, to deep-sea vents, to whales and even seabirds – is dubious, he says.

"My questions relate to the substantive and procedural utility of linking different objectives in different areas, or with respect to different resources, under some general category such as MPAs," said Oxman. "The mere fact that one state might proffer good [MPA-related] solutions with respect to one type of problem in one area does not mean that the conceptual solutions it supports would have that effect elsewhere, or that the precedent set would further environmental goals in general."

He suggests that specific management tools and organizational arrangements appropriate to the particular problem at hand should be utilized, such as restrictions on fishing adopted by the relevant fisheries management organization, or limitations on mining adopted by the International Seabed Authority. These can be both general and area-specific, says Oxman.

Hjalmar Thiel of the University of Hamburg (Germany), who served as a chair of the workshop, said its consensus conclusions and summary record would stimulate discussions on high-seas protected areas within the UN Informal Consultative Process on Oceans and Law of the Sea. Among the conclusions were:

1. The UN Convention on the Law of the Sea provides the framework for all action to conserve biodiversity and other components of the high-seas environment.

2. There are areas of the high seas where more effective means of sustainable management and conservation within the framework are considered desirable, and in some cases urgent. These means may include MPAs and other tools.

3. It is essential to recognize the need for responses to threats to biodiversity and various components of the marine environment in the high seas to match in their speed the rapidity by which threats can arise and be realized.

[The proceedings *Expert Workshop on Managing Risks to Biodiversity and the Environment on the High Seas, Including Tools Such as Marine Protected Areas — Scientific Requirements and Legal Aspects* published as "BfN Skripten 43" may be ordered from: International Academy for Nature Conservation, Isle of Vilm, 18581 Lauterbach/Ruegen, Germany. E-mail: *bfn.ina.vilm@t-online.de*.]

For more information:

Charlotte de Fontaubert, IUCN, 1630 Connecticut Ave., NW, Washington, DC 20009, USA. Tel: +1 202 487 8838; E-mail: *fontaubert@att.net*.

Bernard Oxman, School of Law, University of Miami, 1311 Miller Drive, Coral Gables, Florida 33124-0221, USA. Tel: +1 305 284 2293; E-mail: *bhoxman@law.miami.edu*.

Hjalmar Thiel, University of Hamburg, Poppenbütteler Markt 8 A, 22399 Hamburg, Germany. Tel: +49 40 6087 5985; E-mail: *hthiel@uni-hamburg.de*.

More Information on Climate Change and MPAs

Last month, MPA News examined the scientific understanding of climate change in the marine environment, and what global ocean warming could entail for the planning and management of MPAs. Following publication, we spoke with three more scientists, who lent further insight to the issues involved.

Pristine reefs and the impact of warming

Susie Westmacott of the University of Newcastle upon Tyne (UK) has studied the impact of the great bleaching event of 1998 on Indian Ocean coral reefs. (The event corresponded with higher sea temperatures, which caused many corals to lose their colorful symbiotic algae and, in some cases, die.) In a paper she co-wrote for the report *Coral Bleaching: Causes, Consequences, and Response* (see box, right), Westmacott stated that the reefs least at risk from human activity – and potentially in pristine condition – seemed to suffer the greatest bleaching and loss of coral cover.

On its surface, her finding might seem to contradict the belief of many coral reef researchers that undamaged reefs are generally more resilient to climate-related stressors. However, Westmacott has an explanation.

"The more vulnerable species of coral still exist in [pristine] locations," said Westmacott, "and the coral cover is generally far higher than in those areas which have already been impacted [by other stressors] – where only the more resilient species remain."

The good news, she says, is that these more vulnerable species are often the fast-growing species, and thus might regenerate most quickly. "The important point to note is that these areas – either protected or simply remote from human activity – have the greatest chance of recovery," she said. "Whereas, those areas impacted and with a high level of pressure are less likely to recover. It is important, therefore, to protect the [pristine] areas even though at first glance – and initially in the short term – it may seem that they are impacted the most."

Response to bleaching on Great Barrier Reef

Areas of the Great Barrier Reef – particularly inshore reefs – suffered severe damage from the 1998 bleaching

Coral bleaching report available

The report *Coral Bleaching: Causes, Consequences and Response*, published by the University of Rhode Island Coastal Resources Center, is available online:

http://www.crc.uri.edu/comm/htmlpubs/coral.html

For more information

Susie Westmacott, University of Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU, United Kingdom. E-mail: *s.westmacott@ncl.ac.uk*.

Alison Green, Great Barrier Reef Marine Park Authority, PO Box 1379, Townsville Qld 4810, Australia. Tel: +61 7 4750 0700; E-mail: *alison@gbrmpa.gov.au*.

Sue Sogard, National Marine Fisheries Service, Hatfield Marine Science Center, 2030 Marine Science Dr., Newport, OR 97365, USA. Tel: +1 541 867 0222; E-mail: *susan.sogard@hmsc.orst.edu*.

event. Now, the Great Barrier Reef Marine Park Authority (GBRMPA) is collaborating with the Australian Institute of Marine Sciences (AIMS) and the US National Oceanic and Atmospheric Administration to assess the causes and consequences of coral bleaching and develop a climate-change risk assessment. The results could have long-term implications for management of the Great Barrier Reef.

For the reef areas at greatest risk from climate change (i.e., inshore reefs), GBRMPA may consider decreasing other pressures on those reefs, says Alison Green, director of GBRMPA's Information Support Group. Such pressures primarily include fishing and poor water quality due to land-based pollution, she says. GBRMPA has already taken a step in this direction, instituting a program aimed at reducing the runoff of land-based pollutants into Great Barrier Reef waters.

"GBRMPA and AIMS also support a network of automatic weather stations which provide an early warning system for coral bleaching conditions on the Great Barrier Reef," said Green. "This monitoring program provides real time alerts for water temperatures and other environmental conditions that may lead to coral bleaching." When an alert is triggered, GBRMPA can respond with aerial and sea-level surveys, documenting the patterns of bleaching and recovery.

In outreach work for GBRMPA, Green provides coral research advice to MPA managers in Pacific island nations. Although it is still rare for local managers to incorporate climate change or coral bleaching into their planning processes, she says, they welcome advice on how to do so. She suggests they conduct research and monitoring surveys of the same type as GBRMPA, but on a smaller scale. "I recommend that they do a simple survey to determine the extent and severity of the bleaching event, and whether the affected colonies recover or not," she said.

Tropical vs. temperate response to warming

In the tropics, a change in sea surface temperature of 1-2° Celsius can spell the difference between a bleached and unbleached reef, severely altering the ecosystem if the corals die. In temperate waters, however, a change of 1-2° Celsius – in and of itself – can yield little direct effect on species survival.

"In tropical marine systems, species have a narrower range of temperatures that they're adapted to, and a lot of species are living at the upper edge of their temperature range," said Sue Sogard, a biologist with the US National Marine Fisheries Service. "In temperate regions, though, there is more flexibility in terms of the range of temperatures that species can tolerate."

Sogard has studied the response to temperature change of two commercially fished species: sablefish and walleye pollock. She found they were able to grow effectively at temperatures much higher than they would normally experience. The limiting factor was food availability. Higher water temperatures led to higher metabolic rates and greater consumption in the fish; if food levels didn't rise in parallel, fish growth potential was limited. When food levels were low, the fish moved to colder water.

Rising ocean temperatures could have a critical effect on food availability. Most notably, if global warming were to shift or slow ocean thermohaline circulation or modify local current patterns — as theorized by some scientists (MPA News 3:1) — primary production would be fundamentally altered. Any existing efforts to protect species or ecosystems, such as with fishery closures, would be affected by shifts in species distribution and habitats. "There's not enough physical information yet to know what's going to happen," said Sogard.

News and Notes

The Channel Islands National Marine Sanctuary and the California Department of Fish and Game have finalized a recommendation for the designation of a no-take marine reserve network around the Channel Islands, on the US Pacific Coast. The recommendation represents the culmination of two years of consensus-based discussions among a variety of interest groups (MPA News 2:10); it will be presented to the California Fish and Game Commission on 24 August 2001. To download the recommendation document, go to *http://www.cinms.nos.noaa.gov/cimpa2.html* …….. The US Department of Commerce has reopened its search process for nominees to serve on the Federal Advisory Committee on Marine Protected Areas. A copy of the call for nominations is available at *http://www.mpa.gov/*. The deadline for nominations is 15 September 2001 ……. For an updated list of MPA-related conferences, visit the MPA News website at *http://www.mpanews.org*.