

Marine Debris and MPAs: Managing the Impacts of Litter on Marine Ecosystems

Marine debris — also called marine litter or ocean trash — can be one of the most visible challenges an MPA faces. Whether it is a plastic bag floating on the sea surface or a discarded fishing net snagged on a coral head, such debris is an easy-to-see reminder that the oceans are not free from human impacts, even in protected areas.

The aesthetic issues may be the least of the problem. The effects of marine debris on wildlife can be deadly. Plastic bags are mistaken by sea turtles for jellyfish, their prey. A snagged net can smother coral while continuing to fish indiscriminately for years, effectively rebaiting itself again and again. Species that feed on the seafloor, where debris often ends up, can be particularly susceptible to impacts. In 2010, a gray whale that beached and died in the US was found to have in its stomach a golf ball, tape, surgical gloves, small towels, sweatpants, and more than 20 plastic bags (www.cascadiaresearch.org/WSeattle-ER.htm).

All MPAs face the challenge of marine debris to one extent or another with litter generated inside their boundaries or floating in from elsewhere, such as from watersheds upstream. For some MPAs, marine debris is one of the most significant problems they face. In this issue, MPA News discusses the challenge of marine debris with MPA practitioners, including the nature and extent of the problem and how they are handling it.

Defining marine debris

The Marine Debris Program of the (US) National Oceanic and Atmospheric Administration defines marine debris as “any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment....”

This encompasses a wide array of materials, from large items — like abandoned vessels that have run aground — to tiny ones, such as microscopic particles that result from the slow breakdown of plastic material. For more background on marine debris, go to <http://marinedebris.noaa.gov>.

A destination for marine debris: Papahānaumokuākea Marine National Monument

The Northwestern Hawaiian Islands are a remote place. A long string of uninhabited islands and atolls, they stretch 1200 nautical miles westward from the main Hawaiian Islands. Due partly to the isolation, the ecosystem contains some of the healthiest coral habitat in the US. To protect it, former US President George W. Bush designated the area in 2006 as an enormous MPA, the Papahānaumokuākea Marine National Monument (PMNM).

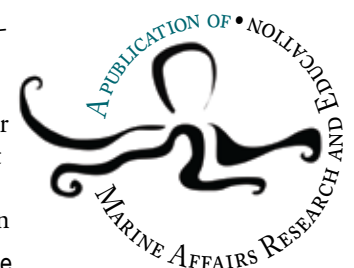
Despite its remoteness, however, the MPA is significantly impacted by marine debris. PMNM is located in the middle of the North Pacific subtropical gyre, a clockwise-moving series of currents that has the effect of retaining and circulating much of the debris that enters the North Pacific. The Northwestern Hawaiian Islands act as a kind of comb, catching debris from the gyre and piling it up on the reefs and shorelines.

The agencies that manage PMNM have several initiatives in place to monitor the debris, remove it, and dispose of the waste properly. Perhaps the most innovative is the Hawaii Nets-to-Energy Program. Much of the debris that impacts PMNM consists of fishing nets — abandoned, lost, or discarded by users as far away as Alaska or Asia. During the nets’ slow drift toward the islands, they often get tangled with others, forming conglomerations that can weigh thousands of kilograms apiece. These present a major environmental hazard to the PMNM ecosystem. The Hawaii Nets-to-Energy Program, involving multiple federal and state agencies and private sector partners, addresses the problem. Once a year, trained NOAA divers remove nets carefully from PMNM reefs and other underwater habitats. The nets are transported to the island of Oahu, where a scrap metal recycling company (Schnitzer Steel) uses its powerful shredder to chop the nets into fragments. The fragments are then taken to a waste-to-energy facility, which burns the material to produce electricity for the island. Since the program’s launch in 2002, it has processed more than 700 metric tons of nets, line, and rope — producing enough energy to run

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nearly 350 of Oahu's homes for an entire year. More information on the program is at <http://marinedebris.noaa.gov/projects/netstoenergy.html>.

The institutional partnerships formed for the Hawaii Nets-to-Energy program are about to be needed more than ever. A new and enormous challenge awaits Papahānaumokuākea managers. The earthquake and tsunami that destroyed parts of eastern Japan in March 2011 and killed more than 15,000 people also washed vast amounts of debris (possibly millions of tons) into the Pacific Ocean. The buoyant portion of that debris — parts of buildings, housewares, and anything else washed to sea — is currently making its way across the ocean. Based on computer models and sightings of the debris by sailors, first landfall is expected to occur in the Northwestern Hawaiian Islands in the coming months, perhaps as soon as January/February 2012. (Landfall estimates and other information on the tsunami debris are available at <http://marinedebris.noaa.gov/info/japanfaqs.html>.)

Carey Morishige, Pacific Islands regional coordinator for the NOAA Marine Debris Program, says much remains unknown about what will end up hitting PMNM. “We do not yet have a good idea of the types and amounts of potential Japan tsunami-generated debris still afloat in the North Pacific Ocean,”

says Morishige. “We are currently working with and through our partners — e.g., other NOAA offices (including PMNM site management), government agencies, shipping and fishing industry, and recreational sailors — to gather information on significant sightings of marine debris in the North Pacific. A tsunami debris workgroup has been formed with partners from governmental, non-governmental, and academic sectors to address, coordinate, and plan for tsunami-generated marine debris. It is this workgroup's goal that through working together and sharing resources, expertise, and knowledge, any impacts of tsunami-generated marine debris will be mitigated or prevented.” (Workgroup partners were panelists in a webinar on 14 November on mitigating coastal impacts of the tsunami debris, coordinated by the International Pacific Research Center; an audio recording will soon be available at <http://iprc.soest.hawaii.edu/users/nikolai/2011/tsunami-debris-workshop>.)

Monitoring the landfall of the tsunami debris will be essential for a timely response. The US Fish and Wildlife Service (USFWS), which manages the terrestrial parts of the Northwestern Hawaiian Islands, has shoreline debris monitoring programs in place. “The NOAA Marine Debris Program has worked with USFWS personnel on Tern Island (in the French Frigate Shoals, Northwestern Hawaiian Islands) to update data collection and monitoring,” says Morishige. “Weekly surveys of the island are being conducted, with data analysis. This is a good site as it has baseline data dating back to 1996. We should be able to notice any changes in the coming months.” A similar debris-monitoring program, established in 2008, is in place on Midway Atoll.

Morishige notes that a figure often cited in the media for the quantity of tsunami debris — 25 million tons — was a Japanese government estimate of total debris (both terrestrial and marine) from the disaster. The actual amount of floating debris may be significantly lower than that figure, since much of the disaster debris stayed on land and another portion likely sank in Japan's nearshore waters. Still, she says, “Even if only a small fraction of that amount arrives in the Northwestern Hawaiian Islands, the impacts could potentially be substantial. It depends on the types and quantities of debris still afloat. The best case would be no significant increase in marine debris to the area, and the worst case would be any significant increase.”

Using MPAs to drive regional debris management

A two-year project to help reduce marine litter across the Wider Caribbean region was completed in July 2011. Co-managed by the Gulf and Caribbean Fisheries Institute (GCFI) and the Caribbean MPA Management Network and Forum (CaMPAM), with financial support from the US State Department, the

“Say No to Plastic Bottles” campaign in Malaysian MPAs

Last year, MPAs in the Malaysian state of Sabah faced a problem: a growing amount of litter — much of it in the form of plastic bottles — was posing a threat to both the marine ecosystem and the tourism industry. Cleanup efforts were struggling to keep pace. Over the course of a day in September 2010, volunteers collected more than 800 kg of trash from one of Sabah's MPAs (Tunku Abdul Rahman Park, which has 30 km² of marine area). Just one year earlier, volunteers had gathered 700 kg of trash from the same site.

In response, the State Tourism, Culture, and Environment Minister Masidi Manjun directed the Sabah Parks agency to institute a plastic bottle reduction program. Implemented this year in cooperation with Borneo Divers (a leading dive operator in Sabah), the program has urged tourists to avoid using plastic bottles inside Sabah MPAs.

“Asking people not to use plastic is difficult,” Minister Masidi told reporters upon launching the program. “However, if we don't do something to reduce plastic bottles, the problem will persist and get bigger.”

Although just a year old, the program is producing positive results. “As a result of the ‘Say No to Plastic Bottles’ campaign, the amount of plastic waste has already been significantly reduced,” says Theresa Tham, director of Borneo Divers. The long-term goal of the program is to end all plastic bottle use in Sabah MPAs.

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project aimed to develop and implement best practices for coastal waste management in the region. It addressed a problem identified by GCFI: that there was a general lack of knowledge about marine litter issues and preventative measures throughout the region — in government, NGOs, and the private sector. (The project was also an opportunity to implement broad recommendations from a regional action plan for marine litter management, developed by the UNEP Caribbean Environment Programme.)

The project strategy focused on marine protected areas. There were three reasons for this:

- **Increasing public awareness:** Marine protected areas can be a useful geographic focal point for the public on issues that impact local “ambassador” species. So by engaging MPAs on the need to address marine debris, the MPAs in turn could help raise public awareness of the problem.
- **Improving management:** MPAs provide pre-existing, dedicated platforms for environmental protection. So any best practices developed for litter management could be implemented readily.
- **Improving compliance:** MPAs can serve as a unifying force and catalyst for change, bringing together an array of stakeholders and responsible authorities (government ministries, coast guards, NGOs, universities, resource users, and more) to support and/or comply with new litter management practices.

The project engaged MPAs in five countries: The Bahamas, Belize, Grenada, Jamaica, and St. Vincent and the Grenadines. Managers worked together to develop a series of best practices such as installing waste and recycling receptacles for MPA visitors, posting anti-littering signage, and educating community leaders and law enforcers about anti-littering laws. Then project leaders and in-country partners worked with the MPAs to help implement those practices.

Project manager Emma Doyle of CaMPAM says the initiative provided several benefits for the participating MPAs. “Through this project, the MPAs were able to focus on implementing the marine litter legislation and regulations that they have the power to enforce, and to educate and develop new efforts in support of these,” she says. “The issue of marine litter also encompasses other important issues like watershed management, ecosystem-based management, and broader stewardship. The experience the managers gained from dealing with marine litter — a problem generated largely outside MPA boundaries — can help prepare them to take on other big, external challenges that call for regional and multistakeholder solutions.”

There were also networking-related benefits for the MPAs. “For the regional MPA network, we had the

benefit of achieving collaboration between MPAs and related institutions on a single important issue,” says Doyle. “This potentially gives us a model project to build on when trying to address other MPA issues and when seeking to increase collaboration between ecologically-connected MPAs in the Caribbean.”

She notes that, as with so many issues facing marine resource management, there is no one-size-fits-all solution to marine litter. “The Wider Caribbean region is highly diverse, composed of more than 40 countries and territories with several languages, differing political contexts, and great economic disparities,” says Doyle. “Educational and interpretive materials, training programs, and initiatives like recycling must be tailored to the local culture and context.” GCFI and CaMPAM are sharing outcomes from the project with the regional network of MPA professionals; the materials and experiences are available at www.gcfi.org.

Training rangers to monitor and remove derelict fishing nets

Most of the marine debris encountered by the coastal regions of northern Australia is fishing-related: nets, ropes, floats, and associated items. Based on analyses of net types, nearly 90% of the derelict nets that can be identified originate from Southeast Asia. During the monsoon season each year, hundreds of nets — some several kilometers long — float into the Gulf of Carpentaria in Australia’s Northern Territory. This annual surge of “ghostnets” poses a challenge for management of the region’s indigenous protected areas. (Most of the northern Australia coast is owned and occupied by indigenous peoples of Australia. An indigenous protected area, or IPA, is where traditional indigenous owners have entered into a voluntary agreement with the Australian federal government, namely to promote biodiversity and conserve cultural resources.)

GhostNets Australia is an alliance of 22 indigenous communities from coastal northern Australia (www.ghostnets.com.au). Established in 2004, the program has trained and supported indigenous ranger groups in removing more than 7500 nets so far, on shore and at sea. The patrols can be arduous. One ranger group, for example, leaves home each May for three weeks to undertake cleanups of fishing gear and other debris at sea. Using a barge and two patrol boats this year, the rangers removed 465 ghostnets weighing a total of 66 tons.

The operational areas of the ranger groups transcend the boundaries of individual IPAs — technically the rangers operate independently of the protected areas. However, there is overlap in the stewardship goals of rangers and IPA managers, and rangers often conduct work inside protected areas. “Typically, GhostNets Australia officers work with rangers based on an

Most common debris items collected from 25 years of the International Coastal Cleanup

On 17 September 2011, hundreds of thousands of volunteers in countries around the world participated in the annual International Coastal Cleanup, now in its 25th year. Managed by The Ocean Conservancy, the event has collected more than 65 million kg of debris over the past quarter-century. The 10 most common debris items found have been, in order:

1. Cigarettes/cigarette filters
2. Food wrappers/containers
3. Caps, lids
4. Cups, plates, forks, knives, spoons
5. Beverage bottles (plastic)
6. Bags (plastic)
7. Beverage bottles (glass)
8. Beverage cans
9. Straws/stirrers
10. Rope

Source: The Ocean Conservancy (2011)

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agreed plan that aims to respect cultural protocols and ties in with existing cultural and natural resource management in the region,” says the program’s Scott Morrison.

A central element to the program has been training rangers to survey and record what they find. “In recent years our data collection has transitioned from traditional paper-based data sheets to include the use of touch-screen technology and picture-based questions in handheld devices,” says Morrison. The devices run a customized GhostNets Australia application that tracks where and when nets were spotted and recovered, as well as technical details like mesh and twine size.

“The technology incorporates much of the equipment needed for ghostnet surveys into one unit, including GPS, camera, tape measure, and survey sheets,” says Morrison. “This means rangers are able to carry fewer pieces of equipment on patrol, and also negates the need for reentering data afterward.” The devices are resistant to water, heat, cold, and dust, and can survive being dropped.

An analysis this year of the data collected from 2004–2009 showed hotspots of ghostnet accumulation in

the northeast and northwest corners of the Gulf of Carpentaria. The most frequently recorded nets were trawl nets, and came from Taiwan and Indonesia.

In 2010, GhostNets Australia took a group of rangers to Aceh, Indonesia. The rangers met with local fishermen there to communicate the Australian experience with ghostnets, as well as how the rangers work together as a community to achieve good outcomes for their land and sea. If the impact of ghostnets on northern Australia shores is to be stopped, it will need to come through more than just patrols. Prevention at the source will be necessary as well. 

More resources on marine debris

- International Coastal Cleanup: www.oceanconservancy.org/our-work/marine-debris/
- Fifth International Marine Debris Conference (occurred March 2011): www.5imdc.org
- Journal of Integrated Coastal Zone Management, March 2011 issue on marine litter (available for free): www.aprh.pt/rgci/issue11f1.html

Letter to the Editor

Clarifying the status of proposed marine reserves in New Zealand

Dear MPA News,

An announcement in your September/October 2011 issue misreported the status of five no-take marine reserves along the west coast of the South Island, New Zealand (“New Zealand designates five no-take reserves,” MPA News 13:2).

The New Zealand Government press release stated that five marine reserves “are to be established...” The Minister of Conservation and the Minister of Fisheries have approved only a proposal for the marine reserves. This is the starting point for the statutory process that all marine reserves must go through, during which they are open for public consultation. In New Zealand, this process can take anywhere from about one year to 15 years to complete before approval and implementation by the Ministers. It is not a formality: boundaries can change as a result of the consultation, and proposals have even been rejected.

The Department of Conservation press release has been updated to reflect this distinction: www.doc.govt.nz/conservation/marine-and-coastal/marine-protected-areas/other-protected-areas/proposed-west-coast-marine-protected-areas.

WWF supports the efforts by the West Coast Marine Protection Forum to identify areas for biodiversity protection because currently less than 1% of New Zealand’s EEZ is protected by marine reserves.

Tyler Eddy

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Correction: MPA News apologizes for misreporting the status of the proposed marine reserves. We asked Christian Bonnevie, press secretary for New Zealand Environment Minister Kate Wilkinson, whether the proposed reserve boundaries are likely to change. He replied, “We expect the boundaries to remain exactly as agreed upon. The process that resulted in the approved proposal already involved considerable public consultation and compromise. We have not heard of any concerns over the boundaries selected as a result. The forthcoming public consultation process is to ensure everyone who wishes to can be heard on the final options chosen. It is our expectation that the marine reserves on the West Coast will be opened officially in late 2012.”

MPA Perspective: Creation of a Network of Locally Managed Marine Areas in the Western Indian Ocean

By Kame Westerman

The Western Indian Ocean (WIO) is home to a rapidly growing number of local marine conservation activities. In Madagascar, for example, new community-based coastal management initiatives have been established along the country's southern, western, and northern coasts with the support of communities and conservation NGOs. Likewise in Kenya, 13 locally managed marine areas of differing management types have been designated since 2006.

Many efforts in the region, however, have been implemented in relative isolation due in great part to the lack of an information-sharing platform. Communication about activities, successes, and challenges within these disparate initiatives should be a priority for continued support and expansion of community-based marine conservation within the WIO.

The emergence of local alternatives for marine conservation

The remarkable marine and coastal biodiversity of the Western Indian Ocean supports vital ecosystem services and local coastal livelihoods, as well as international fisheries markets. Yet, as in many developing countries worldwide, government agencies often lack the finances and resources to effectively manage the region's vast coastlines.

The growth of locally managed marine areas, or LMMAs, is filling that position. *Locally managed marine area* is a broad term, often defined as an area of nearshore waters and coastal resources that is largely or wholly managed at a local level. The management may be conducted by coastal communities, land-owning groups, partner organizations, and/or collaborative government representatives who reside or are based in the immediate area. As such, most community-based marine conservation initiatives can be described as some form of LMMA.


Creating a network

Sharing experiences — both challenges and successes — in community-based coastal conservation and development is essential to protecting the critical biodiversity and marine ecosystems upon which coastal livelihoods and cultures depend. In the Pacific and southeast Asian regions, where the LMMA model has proven highly successful for many years, the Pacific LMMA Network has evolved to provide a monitor-

ing and support platform to grassroots marine conservation initiatives (www.LMMAnetwork.org).

As LMMAs become more widespread in the WIO region, creating similar opportunities to collaborate and share relevant knowledge with other management bodies becomes even more essential. Much of the expansion of LMMAs on the southwest coast of Madagascar, for example, has come about through information sharing and community exchanges — most notably an expansion of temporary octopus closures to more than 50 villages over the last five years. While these physical community exchanges are useful, they are not often feasible for financial or other reasons, and therefore other forms of communication and information sharing must be explored and developed.

A side event on LMMAs at the Western Indian Ocean Marine Science Association symposium in October 2011, attended by over 60 marine conservation practitioners, aimed to begin building these communication connections across the region. It will be done by developing a WIO LMMA directory and kickstarting much-needed dialogue on issues related to community-based management. Using a website dedicated to community marine conservation in the WIO (www.livewiththesea.org), the directory will connect practitioners and help them to facilitate information sharing and collaboration. The directory will be available on the website a few months from now. In addition, through connecting community members, LMMA practitioners can expect improved peer-to-peer learning and better community engagement and ownership of projects.

For the moment, the WIO LMMA network will remain informal and concentrate on linking people and information. However, if it develops significant momentum in the future, a more formalized network similar to the Pacific LMMA Network could evolve. 

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To be added to the WIO LMMA directory, e-mail Shawn Peabody at shawn@blueventures.org.

Editor's note:

Kame Westerman is coordinator of the Velondriake Locally Managed Marine Area on the southwest coast of Madagascar. She works for Blue Ventures Conservation, an NGO.

MPA Perspective: Promoting Peer-to-Peer Dialogue to Achieve Successful MPA Targets

Editor's note:

The co-authors of this essay work in the WWF Mediterranean Programme.

By Giuseppe Di Carlo and Alessandra Pomè

For marine protected areas, community and stakeholder participation are generally considered essential elements for achieving management and conservation targets. However, some sectors – particularly fishermen and tourism operators – continue to view MPAs as limiting factors for their activities and revenues. It can be difficult for MPA authorities to overcome these sensitivities over access to fishing grounds, development permits, and community rights.

In these cases, promoting peer-to-peer dialogue can help to resolve such conflict. That is, success stories and first-hand examples from neighbor sites or countries can positively influence the opinion that fishermen and other sectors hold toward MPAs.

Exchanges of managers and stakeholders between Mediterranean MPAs

To facilitate greater stakeholder engagement in Mediterranean MPAs, WWF has supported exchange visits involving managers, fishermen, and dive operators from various countries. (The exchanges have been conducted through the MedPAN South project, which supports southern Mediterranean countries in developing effective MPAs: http://mediterranean.panda.org/about/marine/marine_protected_area/the_medpan_south_project.)

Mentor MPAs — sites with well-established co-management approaches and management plans, for example — have hosted MPAs with internal conflicts (such as where no-take zones are being designated with stakeholder opposition) or that were in the process of developing management plans. Several of these exchange visits have been organized, with nine during 2010-2011.


In one of the exchange visits, local fishermen from communities within the recently designated Lastovo Islands Nature Park (Croatia) visited the Marine Reserve of Torre Guaceto (Italy). For several years, Torre Guaceto has featured a co-management approach between the MPA authority and local fishermen (roughly one-tenth of the 22-km² site is no-take, while the remainder allows fishing with certain gears at certain times). This approach has allowed high revenues for the fishermen while meeting conservation targets for the MPA. Most importantly the fishermen have taken ownership of this achievement. So at a time when the Croatians were struggling with the identification of potential fishing and no-fishing zones within their MPA, what could be more useful than the Italian fishermen telling their story? As soon as the fishermen got together, the conversations were very productive. The Croatian fishermen who visited Torre Guaceto took home their experience so that their entire community could benefit from the experience.

On another exchange, a group of managers, dive center operators, and fishermen living in the Kas-Kekova Specially Protected Area (Turkey) visited the Nature Reserve Bouche de Bonifacio in Corsica (France). The most important discussions occurred at sea. The fishermen went fishing and discussed fishing gear use, their work with tourists, and their regulated access to fishing grounds. Divers went diving and explored underwater trails, how sustainable diving activities are promoted, and how to engage tourists in protecting the environment. The managers learned about how all this comes together in the management plan, how to achieve financial sustainability for the MPA, and, finally, about the benefits that the MPA has brought to the environment and the community of Bonifacio. Again the conversations were highly productive and positive. The visitors returned home and told their peers and colleagues how conflicts can be overcome.

These visits have led to agreements between MPAs, formally stating cooperation on activities including management plan development, monitoring, etc. This is the case with the agreement brokered by WWF between the Office de l'Environnement de la Corse (OEC) that manages natural reserves in Corsica and the authority in charge of National Parks in Algeria to provide technical support and transfer knowledge on MPA management. Such cooperation contributes to strengthening the Mediterranean MPA network and to securing stakeholder support for MPA business. Networking and cooperation becomes particularly critical at a time when a new push is needed to reach the marine conservation targets of the Convention on Biological Diversity in the Mediterranean Region.

Lessons learned

A few lessons we have learned from these exchanges include:

- Choose all participants carefully. Ideally participants from the visiting MPAs should be (1) community leaders, (2) committed to learn, (3) willing to share their experience with peers at home, (4) clear on why they were invited, and (5) ready to contribute actively to the planning of the exchange.
- Plan in advance. MPAs are usually overwhelmed with pre-existing responsibilities and have limited time to dedicate to exchanges, particularly during the summer. We recommend starting to plan exchanges at least four months ahead.
- Enable collaboration. Foster the establishment of long-term collaborations between visiting and hosting MPAs by ensuring participation of key decision-makers in the exchange. Decision-makers provide the political support and endorsement to begin a long-term partnership. 

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Notes & News

In policy reversal, Colombia announces no oil exploration in Seaflower MPA

On 1 October 2011, Colombian president Juan Manuel Santos announced his Government will not allow oil exploration or production in the Seaflower Biosphere Reserve and Marine Protected Area due to the risk such activities could cause to the site's environment. This marks a reversal of policy for the Government: in 2010, the National Agency of Hydrocarbons (ANH) auctioned two areas inside the MPA for exploration. The lease sites — more than 20,000 km² combined — covered almost a third of the 65,000 km² MPA, located in the San Andres Archipelago of the southwest Caribbean.

A lawsuit to stop the exploration was filed earlier this year by CORALINA, the environmental authority for the San Andres Archipelago (MPA News 12:5). The suit claimed that the oil leases violated several international agreements ratified by the Colombian government, including the UN Convention on Biological Diversity; International Labour Organization Convention 169 (which protects tribal and indigenous people); and the UN Declaration on the Rights of Indigenous Peoples.

Marion Howard, MPA adviser to CORALINA, said of President Santos' announcement, "This is an enormous victory for marine conservation and for the people, both of San Andres and the many supporters on the mainland." The islands have a population of 80,000, including the indigenous Raizal people. The MPA allows sustainable fishing and harvest by locals.

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CCAMLR agrees on framework for developing MPAs in Antarctica

The global body responsible for managing Antarctica's marine living resources has agreed on a framework for developing MPAs throughout Antarctic waters, including no-take marine reserves.

In early November at its annual meeting in Australia, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR, www.ccamlr.org) began what will be a 12-month process of building an Antarctic MPA network, calling

on its members to develop detailed proposals. Several CCAMLR member nations have already put forward ideas. Australia, for example, has proposed six MPAs covering almost 1 million km² in East Antarctica, while New Zealand and the US have proposed MPAs for the Ross Sea.

"Creating this roadmap is only the beginning of a process to determine marine protected areas, but just getting this far is a massive advance," said Australian Environment Minister Tony Burke about the CCAMLR agreement on MPAs. "[The] decision says that the Southern Ocean is a foundation stone for marine life, not a resource to be treated like a quarry."

Also at the CCAMLR meeting, a new consortium of conservation organizations — the Antarctic Ocean Alliance (www.antarcticocean.org) — released its own plan for an MPA network in the region. The plan calls for 19 MPAs and no-take marine reserves. The areas proposed for protection include the Ross Sea, Antarctic Peninsula, East Antarctica, and the Weddell Sea.

IUCN presents new guidelines on protected areas legislation

A new publication from IUCN helps national governments to create the legal frameworks needed to support effective designation and management of protected areas. Drawing on international best management practice and legal principles, the report serves as an update and expansion of guidelines produced by IUCN in 1980, and incorporates new and emerging issues. These issues include:

- How to integrate coastal and marine protected areas into land use and marine spatial planning;
- How to support new types of governance, such as private protected areas and community-conserved areas;
- How to build flexibility into protected area legislation, including to allow for climate change adaptation; and
- How to involve an array of innovative and sustainable financing mechanisms into protected area systems.

An entire chapter is devoted to special issues pertaining to MPAs — from their unique characteristics and management challenges, to MPA-specific international obligations, to incorporating marine principles in legislation. The 400-page report *Guidelines for Protected Areas Legislation* is available at <http://data.iucn.org/dbtw-wpd/edocs/EPLP-081.pdf>.

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Framework approved for Canada's MPA network

The *National Framework for Canada's Network of Marine Protected Areas* was approved in principle on 1 September by the Canadian Council of Fisheries and Aquaculture Ministers, representing federal, provincial, and territorial governments. The document provides strategic direction for the design of a national MPA network, including:

- Overarching vision and goals;
- Design properties;
- Eligibility criteria for inclusion in the network;
- Network governance structure; and
- Guidance for promoting national consistency in bioregional network planning.

Canada will now move ahead with implementing the framework, including MPA network planning at the bioregional level. The *National Framework* is available at www.dfo-mpo.gc.ca/oceans/publications/dmpaf-eczpm/framework-cadre2011-eng.asp.

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Project is planting 26,000 mangrove trees in Philippine MPA

In an effort to improve nearshore fish habitat and provide greater food security for coastal communities, a project is underway to plant 26,000 mangrove trees in the Hingatungan Marine Protected Area in the Philippine municipality of Silago, in the province of Southern Leyte. The trees are also expected to help protect coastal communities from climate change impacts, including increased storm activity.

From the Database: Largest MPAs by Hemisphere

The following data are from the World Database on Protected Areas, compiled by the UNEP World Conservation Monitoring Centre. Information on each of the MPAs is available at www.protectedplanet.net.

Southern Hemisphere

1. Kermadec Benthic Protection Area, New Zealand: 620,467 km²
2. Chagos Environment Preservation and Protection Zone, British Indian Ocean Territory: 544,000 km²
3. Phoenix Islands Protected Area, Kiribati: 410,500 km²

Northern Hemisphere

1. Papahānaumokuākea World Heritage Site, US: 362,075 km²
2. Marianas Trench Marine National Monument, US: 246,608 km²
3. Pacific Remote Islands Marine National Monument, US: 225,038 km²

As of the end of October, more than 19,000 of the trees had been planted already. Most of the planting work has been done by impoverished families hired for the project. The budget for the "Enhancing Food Security in the Visayas" tree-planting project is P1.3 million (US \$30,000). A news report on the project is at www.pia.gov.ph/?m=1&t=1&id=61183.

New mobile website informs users when they are near, or in, an MPA

The Department of Fish and Game for the US state of California has launched a mobile website that allows users to easily access information on the state's restricted areas (such as site regulations and boundaries) from smartphones and other portable devices. Aimed largely at fishermen and divers, the website lets users search for any current California MPA by name or geographic area. For portable devices with GPS included, the website can even indicate the user's current location on a map and whether the user is inside or near any MPAs.

The mobile website is at www.dfg.ca.gov/m/MPA. The Department's main website (www.dfg.ca.gov) provides similar information but does not offer the interactive GPS feature and is generally not as compatible with portable devices.

Study: Several factors associated with management success in Coral Triangle MPAs

A study of MPAs and MPA networks in Indonesia, the Philippines, and Papua New Guinea has determined that the effectiveness of sites in meeting management goals is associated with a wide range of factors. These factors include sustainable financing for management, clarity of MPA network rules, enforcement by community-level enforcers, local skills development, involvement in management by local elected politicians, a functional management board, multi-stakeholder planning mechanisms, and participatory biophysical assessments. The study was conducted via field interviews with community members throughout the Coral Triangle region.

The research team consisted of scientists and field practitioners drawn from several large NGOs (Rare, The Nature Conservancy, WWF, Conservation International, and the Wildlife Conservation Society) as well as the University of Washington and other partners. "Emerging Marine Protected Area Networks in the Coral Triangle: Lessons and Way Forward" appears in the journal *Conservation & Society* (Vol. 9, No. 3) and is available for free at www.conservationandsociety.org/text.asp?2011/9/3/173/86986.