

Invasive Species: Their Threat to MPAs, and How Practitioners Are Responding

Owing in large part to increased globalization of shipping, the unintentional transfer of plants and animals from one water body to another worldwide has boomed in recent decades; many bays near major ports are now host to dozens or even hundreds of non-native species. Some of these visitors thrive in their new habitats, outcompeting native species and changing ecosystems, sometimes dramatically. For MPAs, such invasions pose a major threat, particularly when management is unprepared for them.

Nonetheless, due to unfamiliarity with the problem, shortage of funds, or other reasons, there have been few cases worldwide in which MPA practitioners have specifically addressed the threat of invasive species in planning or management. This month, *MPA News* examines the elements of protection against bioinvasions, as well as cases in which practitioners are working to keep their MPAs safe.

Vector management

MPAs are generally designed either to (a) protect species and habitats that are already on site or (b) encourage re-establishment of those that were there in the past. However, an invasive species that is particularly well-suited to an ecosystem, with no natural predators, parasites, or pathogens to control its population, can change that ecosystem to one never seen before. The invader's population soars while populations of competitors — for food, space, light, or other needs — shrink. A cascade of effects throughout the system may result.

Terminology of bioinvasions

Alien: describes a species that has been introduced to a habitat beyond its natural distribution range; similar terms include non-native, non-indigenous, introduced, and exotic.

Invasive: describes an alien species that acts as "an agent of change and threatens native biological diversity" in its new habitat (IUCN 2000). Not all alien species become invasive. Technically, invasiveness can be difficult to measure, as there are no quantitative guidelines for what constitutes a change or threat to a habitat.

Examples of how invasive species have taken over marine and coastal systems include these:

- The seaweed *Caulerpa taxifolia*, originally native to the Pacific and bred in Europe for aquarium use, escaped from an aquarium in Monaco in the mid-1980s. It proceeded to colonize and smother vast areas of the Mediterranean, dispersed by anchors, fishing gear, and other pathways.
- The comb jelly *Mnemiopsis leidyi*, transported in ballast water by a ship from the Americas, first appeared in the Black Sea in the 1980s and quickly exploded in population, consuming much of the sea's zooplankton, fish eggs, and fish larvae. Commercial fisheries nearly collapsed.
- The European green crab (*Carcinus maenas*) has invaded numerous coastal communities worldwide by a variety of pathways. Green crabs are omnivores, eating mollusks and many other prey items, and have been blamed for the collapse of at least one clam fishery in North America.

One of the primary pathways, or vectors, by which marine alien species are transported is on the hulls or in the ballast tanks of ships, says Jim Carlton, a biologist and invasive species expert with the Maritime Studies Program of Williams College and Mystic Seaport (US). A single ballast tank filled from surrounding waters to stabilize an un-laden ship may contain hundreds of species and millions of individuals, says Carlton. Additional vectors include aquaculture, the aquarium trade, fisheries enhancement, and the use of live bait, among others. (Carlton says the green crab established itself in San Francisco Bay [US] following a shipment there of bait worms packed with crab-laden seaweed.)

"The most important current strategy in marine bioinvasion management is the reduction and prevention of invasions by focusing on the vectors that now transport and release non-native species," says Carlton. Controlling how ships release ballast water, for example, can be critical to reducing the threat of invasions in waters near ballast-water release sites. In this regard, the International Maritime Organization (IMO) in

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Dear reader:

This issue of *MPA News* covers the months of December 2004 and January 2005, allowing our staff a year-end holiday. In February, our regular monthly delivery will resume.

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Advice to managers on invasions

Don Hough

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Don Hough has helped coordinate the Victorian government's efforts on invasive species and its development of a system of marine national parks and marine sanctuaries. *MPA News* asked him for his advice to MPA managers on invasive species, and he offered these tips:

- "Keep your boats clean and set an example. Managers are instrumental in promoting prevention of invasions. Prevention is always better than the cure.
- "Ensure that the work you commission, or the operators you regulate, is done in ways that are sensitive to invasive species risks.
- "Use your eyes and ears to keep track of new introductions."

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February 2004 adopted the International Convention for the Control and Management of Ships Ballast Water and Sediments, setting standards for improved ballast water management worldwide (<http://globallast.imo.org>). The convention regulates where, when, and how to release ballast water, and awaits ratification by 30 nations to take effect.

As indicated by the need for such a convention, the problem of marine invasive species is one that transcends MPA boundaries: alien species, if not deposited directly into an MPA, can still float, swim, or crawl there from outside. To work best, vector management programs should be conducted at regional, national, or international levels. Individual MPAs can help by raising awareness among authorities of the problem and its potential impacts on protected areas, and supporting the adoption of vector management approaches in their region.

MPAs can also play an invaluable role in early detection of regional invasions through their normal monitoring programs. "Adding early detection of invasions to MPA monitoring is key," says Carlton. "The early detection and rapid destruction of an incipient population of an exotic species may be second only to preventing the invasion in the first place." He notes that the public can play a major role in early detection programs by alerting authorities to unfamiliar species of animals and plants. Particularly important, he notes, are those stakeholders who have life-long familiarity with the regional biota.

When a potentially invasive species is discovered inside an MPA, rapid response to eradicate it is key. The longer the wait to respond, the more likely it is that the species will establish itself, making full removal difficult if not impossible. This is particularly the case where the original delivery vector remains in place.

Preventing invasions: Northwestern Hawaiian Islands, US

In terms of being able to prevent bioinvasions, the ideal MPA would be one that was remote with relatively little vessel traffic. In addition, its primary visitors would be aware of the threats posed by alien species, and would take voluntary steps to avoid introducing them.

This largely describes the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, or NWHICRER. Despite the site's proportions — at 341,000 km² in area, it is the world's second largest MPA — the reserve comprises the most remote large-scale coral reef ecosystem on the planet, stretching northwestward from the main Hawaiian Islands in the middle of the Pacific Ocean. It has few human residents and no major ports. And its primary visitors — scientists there to study the region's reef ecosystem — have undertaken several measures aimed at ensuring they do not bring unintended visitors with them.

Despite these protections, invasive species remain a big concern to NWHICRER managers, even compared to other problems such as marine debris, which gets trapped by the islands in enormous quantities. "While the impacts of marine debris to Northwestern Hawaiian Islands ecosystems are significant, invasive and introduced species may ultimately pose a more significant threat," says Randy Kosaki, research coordinator for the reserve. "Whereas accumulations of marine debris can be removed and may ultimately be controlled at their sources, introductions of marine alien species are essentially irreversible. Thus prevention of introductions is among our highest priorities in managing anthropogenic impacts."

In these islands, the main potential vector for alien species is the hulls of vessels, says Kosaki. "Of the relatively few vessels that access the Northwestern Hawaiian Islands, research ships are among the most frequent visitors," he says. "Thus, they are likely candidates to serve as vectors." Most ships operated by the National Oceanographic and Atmospheric Administration (NOAA) are home-ported in the main Hawaiian Islands, at ports with numerous non-native species. Such species could hitch a ride on a ship's hull to the reserve and start up a new colony.

"All NOAA ships accessing the NWHICRER on reserve-sponsored research trips are subject to voluntary hull inspections by trained divers prior to departure," says Kosaki. "This is in part a feasibility study to see whether such regular inspections are practical and cost-effective. If this pilot program is successful, such inspections may be considered as potential regulations for all NOAA ships going to the Northwestern Hawaiian Islands."

In addition, dive gear used in the main Hawaiian Islands by researchers is subjected to a 24-hour freshwater soak prior to use in the NWHICRER, and gear is also given a 10-ppm chlorine freshwater immersion between reefs in the reserve. "Such dips should prevent introductions of alien species via dive gear and minimize the probability of research divers becoming vectors for viral pathogens that may underlie some coral disease syndromes," says Kosaki.

Scientists are even working to prevent unnatural transfer of genetic information between reefs in the reserve. "The Northwestern Hawaiian Islands are one of the few large-scale coral reef systems where meta-population models and rates of gene flow between reefs can be studied," says Kosaki. "Researchers on reserve expeditions must release all organisms at the reefs from which they were collected to avoid artificial facilitation of gene flow." Like the other preventive measures, this is voluntary but may be considered as a regulation or permit requirement for the reserve in the future, he says.

Reserve scientists are working with researchers at other institutions to develop technologies for management

needs, including invasive species detection. One project underway with the University of Hawaii, for example, is identifying genetic markers for alien species; with that knowledge, inspectors will be able to detect the presence of unwanted alien species from ship hull swab samples prior to departure for the reserve.

Combating an invasion: Monterey Harbor, US

Eradication of marine invasive species is still a relatively new field; cases of the successful removal of an invasive species are rare, unfortunately. Monterey Bay National Marine Sanctuary (MBNMS), off the US state of California, is working to fight the invasion of a seaweed species that has colonized a harbor neighboring the MPA, and personnel recognize the challenge they face.

The Asian kelp *Undaria pinnatifida*, more commonly known as wakame, was discovered in Monterey Harbor in August 2001. A highly invasive species that is native to eastern Asia, *Undaria* has been found in New Zealand, Australia, Argentina, the Mediterranean, and the UK over the past 30 years. At the time of the colony's discovery, Monterey Harbor was already host to dozens of documented alien species, although no concerted eradication attempts had yet been made by authorities. But *Undaria* — with its rapid growth and high fecundity, among other characteristics — was particularly viewed as a potential threat to the sanctuary's native kelp forests located nearby. With the invasion localized to the harbor at that point, MBNMS moved to address it and, if possible, eradicate it.

First, researchers determined the extent of the colonization. "Initially several individuals were found, but subsequent searches in late 2001 and early 2002 indicated that *Undaria* was more broadly distributed in the harbor than had originally been thought," says Steve Lonhart, scientist with MBNMS. State and sanctuary officials launched a formal *Undaria* management program in October 2002. It has involved a team of volunteer divers removing *Undaria* manually from harbor docks and pilings, with research volunteers collecting data on *Undaria* locations. So far it appears that the *Undaria* is keeping pace with the eradication effort. "Given its spread from the center of the harbor to adjacent areas, it is likely that spores are being carried beyond the confines of the harbor," says Lonhart.

He recognizes that eradication of the plant is not possible unless the vector of transmission — vessel hulls in this case — is addressed. "Even if all *Undaria* were removed from Monterey Harbor, there are no mechanisms in place to prevent reintroduction by vessels entering from infected harbors in Southern California," says Lonhart. "Thus eradication is not a viable option. However, management of the population can reduce the rate of spread to the adjacent open coast and to harbors north of Monterey, and this is currently the main objective." It is unknown how *Undaria* will interact

with the native kelp, which can grow to 150 feet. Invasive *Undaria* has been observed to grow in thick carpets along the seafloor in New Zealand and Argentina, altering native seaweed communities.

One management option would be to develop a market for the harbor's *Undaria*, which is commercially grown elsewhere in the world and used in miso soup. Lonhart says a local export company determined that samples of the Monterey *Undaria* were suitable for human consumption, but that the amount in the harbor was too low so far to be commercially feasible. The concept of harvesting *Undaria* as food for farmed abalone has also been considered, although it would need to be done in a way to avoid spreading *Undaria* spores in the process.

Considering the likely vector by which *Undaria* arrived, would hull-cleaning programs be an option for the sanctuary, including to prevent introduction of additional aliens? Lonhart says that is unlikely. "A program to clean vessels would require a tremendous amount of infrastructure (e.g., a location for inspecting hulls, cleaning them, and managing this information), a significant long-term financial investment, and a program to monitor its success," he says. Unlike NWHICRER, simply too many vessels use Monterey Harbor to make such a program possible, for now. Lonhart hopes that eventually there could be systems to treat vessel hulls with UV light or high-pressure, heated water to kill harmful spores and bacteria quickly and efficiently. In the meantime, MBNMS is monitoring *Undaria*'s spread and its eventual interaction with the native kelp.

Monitoring an invasion: Saldanha, South Africa

West Coast National Park (WCNP) on the Atlantic coast of South Africa contains both an internationally recognized wetland (Langebaan Lagoon) and the country's second largest bulk port, Saldanha. Thanks in part to the heavy ship traffic, WCNP is host to more than half of the marine introduced species observed so far in South Africa. One of these, the above-mentioned European green crab (*Carcinus maenas*) appears practically tailor-made to take over the park, says Charlie Griffiths, a biologist at the University of Cape Town. "There is concern it may invade the Saldanha Bay system, which contains large areas of ideal habitat," he says.

What Saldanha Bay and WCNP offer the mollusk-eating crab is wave-protected rocky habitat, the

Web sources of information on invasions

Invasive Species Specialist Group of the IUCN Species Survival Commission — <http://www.invasives.org>

IUCN Guidelines for the Prevention of Biodiversity Loss Caused By Alien Invasive Species — <http://www.iucn.org/themes/ssc/pubs/policy/invasivesEng.htm>

IUCN Aliens newsletter (Number 17 2003), special issue on invasive alien species and protected areas. For a copy, e-mail Carola Warner, University of Auckland, at c.warner@auckland.ac.nz

Invasive Alien Species: A Toolkit of Best Prevention and Management Practice, produced by the Global Invasive Species Programme — <http://www.cabi-bioscience.ch/wwwgisp/index.html>

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availability of which has been the invader's primary limiting factor in its spread up the South African west coast, says Griffiths. Researchers first discovered a mating pair of the crab in Saldanha Bay in 1990.

Griffiths has begun monitoring the crab and other alien species in the park to set a benchmark on their status; future surveys will compare results to see whether spread has occurred. Unexpectedly, his recent benchmark survey of the green crab found just one dead carapace (shell), despite the presence of suitable habitat and numerous potential food species. He suspects the possibility that a population exists at such low densities that no live specimens could be found — which, again, would be surprising considering at least some individuals were present more than a decade before.

There is no eradication program to explain the absence, says Griffiths. “The authorities do not have an eradication program in place pending this or any other invasion,” he

says. “It is, I guess, an unfortunate reality that in a country in which 20% of the population are HIV-positive, 40% are unemployed, and 50% lack electricity, invasive marine species are not considered a priority issue.”

Despite the lack of green crabs in his survey, Griffiths remains concerned about a potential invasion of WCNP — if not by this species then by another. He says the government could take simple steps that would nonetheless help a great deal in fighting invasions in its marine parks: namely, pairing routine surveys by parks authorities with a list of known global invaders known to occur in similar areas elsewhere. This could allow early detection and, potentially, eradication. “The parks authority is the one permanently on site, running tours, inspecting catches, etc., and thus the one most likely to encounter any invasion,” he says. “I suggest arming them with the information.” 

Advice to Managers on Invasions: Imène Meliane, IUCN Global Marine Programme


Editor's note: Imène Meliane is marine program officer for the IUCN Global Marine Programme, and has been active on marine invasive species issues around the world, most extensively in the Mediterranean and South America. *MPA News* requested her insights on invasive species and her advice to MPA managers. Below is her response, aided by contributions from Marnie Campbell and Chad Hewitt, both of Biosecurity New Zealand:

“Anecdotally, there is a propensity for protected areas to be invaded. MPAs are points of significant attraction for marine tourism, including recreational boating, yachting, the diving and snorkeling industry, and, where allowed, recreational and artisanal fishing. All these activities are likely to lead to increased risks of introducing non-indigenous marine species associated with hull fouling; ballast water (of some cruising yachts); the accidental transfer of species via anchor wells and chains, or on wetsuits as spores or microscopic phases; and bait material from recreational fishing. In addition, many MPAs around the world are located immediately adjacent to major ports and shipping lanes, and in some cases may actually host ports and/or shipping lanes within their boundaries.

“The designation of protected areas rarely has the requirements to establish baseline biodiversity information, or even more rarely, to monitor the performance of protection over time. Similarly, the policy or regulations controlling these areas are established to protect biodiversity and hence the ability to remove species, as in the case of an incursion response, is limited or unavailable.

“The risk of not coping with invasive species in marine protected areas is high. These species can undermine the benefits the MPA is providing, drastically change biodiversity, threaten endangered species, and severely impact both tourism and fisheries. Unless invasive species are addressed in management plans, MPAs are not safe from their impacts.

“Addressing marine bioinvasions is not an easy task and protecting MPAs in the borderless marine environment is certainly a challenging issue. However, MPA managers with minimal budgets and working in countries or regions where there is no plan to combat invasive species can and must make the difference.

“Many MPAs have monitoring programs. Although these generally do not consider invasive species, they could easily be modified to this end, as could regulations (e.g., to require a baseline survey for the establishment of the MPA, and to allow eradication of invasive species in case of an incursion). Awareness is essential, and local communities can play a critical role to help address invasive species. And most importantly, MPA managers can reach out for help.” 

Imène Meliane and Linda Shaw of the (US) National Oceanic and Atmospheric Administration are conducting a survey of MPA managers worldwide to compile experiences and perspectives on invasive species and MPAs. The project goal is to extract lessons learned and provide technical advice for managers and policymakers. To participate, contact Meliane at imene.meliane@iucn.org or Shaw at linda.shaw@noaa.gov.

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IUCN Recommends Temporary Ban on High-Seas Bottom Trawling

IUCN, the World Conservation Union, has called on the United Nations General Assembly in 2005 to place an interim ban on bottom trawling on the high seas until a legally binding management regime is established to conserve deep-sea biodiversity from the impacts of such fishing activity. Furthermore, IUCN recommends that the UN call in 2006 for a similar interim ban in areas covered by regional fisheries management organizations, again until protective management measures are in place.

The IUCN recommendations, made at the World Conservation Congress in Bangkok (Thailand) in November, carry the force of the organization's full membership, consisting of 81 states, 114 government agencies, and 800+ NGOs worldwide. (At the World Parks Congress in 2003, marine theme participants called on the UN to consider a moratorium on trawling of certain high-seas areas — seamounts and deep-sea coral reefs — but it reflected the views of only these participants, a subset of the entire IUCN [*MPA News* 5:4].)

Although not specified in the trawling-ban recommendations, the eventual management regimes would likely include no-take zones around some of the most vulnerable and still largely unexplored habitats — like seamounts and deep-sea coral communities. “There are vast gaps in knowledge about the biodiversity of the high seas and deep oceans,” says Graeme Kelleher, chairman of the High Seas MPA Task Force for the IUCN World Commission on Protected Areas (WCPA). “We must act now to safeguard vital areas and species through high-seas marine protected areas and eliminate destructive fishing practices, or we will lose them.”

Bottom trawl fishing is unregulated in extensive areas of the high seas — waters beyond national jurisdiction — and few regional fisheries management bodies have used their jurisdiction to control such fishing to protect sensitive habitats. An exception is the North East Atlantic Fisheries Commission, which agreed in November to close five seamounts and part of the Reykjanes Ridge (near Iceland) to fishing to protect vulnerable habitats (http://www.neafc.org/news/docs/2004press_release_final.pdf).

Seamounts are among the deep-sea habitats most vulnerable to exploitation. Worldwide there are estimated to be tens of thousands of these undersea mountains, but most have never been mapped, much less explored. Nonetheless, the known ones have become

targets for the orange roughy fishery. Heavy exploitation can rapidly deplete a seamount's stock of this valuable but slow-to-reproduce species while also destroying any deep-sea coral and sponge communities present.

Precautionary approach

The UN General Assembly made progress toward an interim ban in November 2004 by calling on states and regional fisheries management organizations to take urgent action to protect vulnerable deep-sea habitats. Notably, it called on them to consider implementing interim bans on a case-by-case basis — that is, protecting one vulnerable area at a time after it has been located and explored by scientists. The UN also established a working group to discuss high-seas conservation and sustainable use, scheduled to meet in February 2006.

Kristina Gjerde, high seas policy advisor to the IUCN Global Marine Programme and coordinator of the WCPA High Seas MPA Task Force, says these UN activities indicate a window of opportunity to work toward achieving an effective high-seas governance system. She adds, though, that any attempts to adopt a case-by-case approach to high-seas conservation should be avoided for the risk involved: the sites could be fished out between their time of discovery and establishment of protection. “The IUCN recommendation of an interim ban on all high-seas bottom trawling reflects a more pragmatic and precautionary approach, as we still do not know where all the seamounts and cold-water corals are located,” she says.

At the World Conservation Congress, IUCN members also recommended the establishment of representative networks of MPAs on the high seas, and that these networks contribute to a global representative network of MPAs by 2012. The WCPA High Seas MPA Task Force launched a website in November to report on its efforts, at <http://www.highseasconservation.org>.

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Toolkit Provides Quick, All-Purpose Guide for MPA Managers in Western Indian Ocean


MPA managers in the Western Indian Ocean (WIO), like their peers in many parts of the world, must deal with a multitude of situations and challenges on a daily basis, often in remote locations and without easy reference to sources of information or assistance. A new “toolkit” aims to help them. Consisting of themed briefs arranged in a ring-binder, the toolkit offers a quick and expert guide to a diverse array of topics, including communications, financing, energy sources, solid waste disposal, coral monitoring, fisheries, and many more. It is designed to address management issues relevant to all types of MPAs in the region, from community-based sites to nationally designated marine parks.

Managing Marine Protected Areas: A Toolkit for the Western Indian Ocean is a collaboration of the IUCN’s Eastern Africa Regional Programme, the Norwegian Agency for Development Co-operation, the United Nations Environment Programme, and the Western Indian Ocean Marine Science Association (WIOMSA). It represents the latest installment in an ongoing regional effort to improve management effectiveness of MPAs. That effort also includes a regional MPA management training course (*MPA News* 2:2) and a training manual for MPA managers produced last year (*MPA News* 5:4).

“The toolkit is designed to complement and build on the regional training course and training manual,” says

Julius Francis, WIOMSA executive secretary. “The training course introduces issues, concepts, tools, and approaches that are relevant to MPAs. However, for day-to-day activities, the MPA manager may need more detailed and specific information, as supplied in the toolkit.” Like the course and manual, the toolkit incorporates both global knowledge of MPAs and information specific to the WIO region, with case studies from nine WIO countries.

WIOMSA is distributing the training manual and toolkit to all MPAs in the region, as well as to resource management agencies and other relevant institutions. The region includes Comores, Kenya, Madagascar, Mauritius, Mozambique, Reunion (France), Seychelles, Somalia, Tanzania, and the state of KwaZulu Natal in South Africa. Limited hard copies will be available for distribution outside the region, although a fee may be charged, says Francis.

Some of the theme sheets and other supporting materials are available on the project website — accessible via the WIOMSA site at <http://www.wiomsa.org> — while the remainder will be posted there at a later date. Additional supporters of the project included the United Nations Environment Programme (UNEP), WWF-Eastern Africa Marine Ecoregion (EAME) Programme, and the Coastal Zone Management Centre of the Netherlands. 

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Notes & News

Victoria (Australia) bans seismic testing in marine national parks, sanctuaries

The state government of Victoria, Australia, has banned seismic testing inside the state’s marine national parks and sanctuaries as a precautionary measure. Seismic testing is used by the petroleum industry to explore for oil and gas below the seabed and involves high-intensity sound waves (*MPA News* 5:10). In an announcement of the ban on 16 November, government ministers said there was “insufficient evidence to prove that seismic testing has absolutely no impact on marine environments.” Conservation groups have charged that the loud sounds generated by such tests can disorient or even deafen marine wildlife, including marine mammals. Drilling for petroleum was already prohibited in Victoria’s marine national parks and sanctuaries, whose boundaries extend to 200 meters below the seabed, but could still have occurred below that boundary as long as drilling was directional (from outside the MPA boundary). The ban on testing, however, prevents

discovery of new oil or gas reserves under these protected areas, making such deep drilling unlikely.

The Victorian government designated 13 marine national parks and 11 marine sanctuaries in 2002 (*MPA News* 4:7), setting aside a total of 540 km², or 5% of the state’s waters, as no-take. Seismic testing for offshore oil and gas is still allowed in the remaining 95% of Victorian waters.

Ningaloo Marine Park in Western Australia to be 34% no-take, up from 10%

The government of Western Australia has announced a new management plan for its coral-laden Ningaloo Marine Park that will increase the site’s no-take zoning from 10% to 34% of the park. Officials expect the plan and new zoning to take effect by the end of this year, once notification and gazetting processes are completed. In addition, the government extended the boundary of the park to include a remaining unprotected portion of

Correction

In our November 2004 issue the e-mail address provided for William Alevizon, author of the essay “Divers Feeding Fishes: A Continuing Issue in MPA Management”, was incorrect. His correct e-mail address is wsawsa@hotmail.com

Ningaloo Reef; that extension expands the marine park to 2640 km² in total area.

Ningaloo and an adjoining terrestrial park reportedly generate AU\$127 million (US\$96 million) annually for Western Australia. Government leaders said the expansion of no-take zones would protect the reef and the state's economy. "Without the reef, there will be no tourism and no future for the region," said Premier Geoff Gallop. Snorkeling and diving will be allowed in the no-take zones.

A public process to plan the new management scheme received thousands of public comments earlier this year. The new plan has been strongly criticized by recreational fishing organizations in the region, which have charged that the planning process allowed insufficient public input and that the expanded no-take zones will be much costlier to enforce than alternative policies proposed by anglers, including the use of catch-and-release fishing areas rather than no-take zones in the newly extended area of the park. "We are not opposed to sanctuary zones, but we don't like them all being put in the best fishing spots," says Frank Prokop, executive director of Recfishwest, a recreational fishing association (<http://www.recfishwest.org.au>).

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New Zealand designates long-debated reserve

After more than a decade of public consultation and discussions among government departments and stakeholder groups, New Zealand has designated a no-take marine reserve in Paterson Inlet and surrounded it with an indigenous-managed fishing zone, or *mataitai*. Together, the 10.8-km² Ulva Island-Te Wharawhara Marine Reserve and 90-km² mataitai (Te Whaka a Te Wera) account for nearly all of Paterson Inlet, home to four species of primitive marine invertebrates, called brachiopods or lamp shells — a focus of scientific interest. The inlet, also known for its exceptional water quality, is on the east coast of Stewart Island, 150 km south of the two main islands of New Zealand.

Local *iwi* (indigenous people) had opposed the idea of a reserve on the site until 2002, when the government proposed designating the mataitai as well. This is the first time the New Zealand government has paired the designations of a marine reserve and a mataitai. Recreational fishing associations still oppose the reserve; they had wanted instead for the whole area to be designated as a mataitai, with no reserve. Recreational fishing is allowed for now in the mataitai, although

long-term regulation of the mataitai will be managed by an indigenous committee. Commercial fishing has been prohibited in the area since 1994.

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Report: Cruises pose threat to Arctic archipelago

The increasing popularity of Norway's Svalbard archipelago as an Arctic cruise destination has amplified the threat of an eventual oil spill that could seriously damage its most vulnerable areas, according to a new report by the WWF International Arctic Programme. Norway has several marine protected areas in Svalbard that total roughly 80,000 km². Several groundings of cruise ships have taken place in the region in recent years, although no major oil spills have occurred yet. "It is only a matter of time before there is a major oil spill on Svalbard," says report author Miriam Geitz. "The only way to lessen this threat is to ban ships from the most vulnerable, high value areas." Geitz says most such areas are already designated as MPAs, but no park management plans are in place and access is unrestricted apart from a small number of specially designated reserves. From 2001 to 2003, the number of Svalbard sites where cruise tourists go ashore increased from 138 to 162.

The report also describes an array of other tourism-related threats to the region — pollution from wastewater and garbage, introduction of invasive species, and wildlife disturbance, among others — and offers recommendations to operators and authorities on addressing each of these. The 80-page report *Cruise Tourism on Svalbard — A Risky Business?* is available online in PDF format at <http://www.panda.org/downloads/arctic/wwfcruiseturismonsvalbard2004.pdf>.

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Paper: Efforts to expand no-take reserves must address social hurdles

Efforts to achieve a significant expansion of no-take reserves worldwide — such as the 20-30% target called for by marine delegates to the 2003 World Parks Congress (*MPA News* 5:4) — face several "collective action problems" that must be overcome before the goals can be reached, according to a review paper by geographer Peter Jones of University College London (UK). Focusing on challenges involved in securing agreement and cooperation from fishermen, the study discusses those raised by divergent aims, locality, lack of predictability, different types of knowledge, the role of advocacy, level of decision-making, and enforceability.

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"There are risks involved in pushing to expand no-take zones without an analysis first of conflict implications and institutional approaches to addressing such conflicts," says Jones. "As no-take zones are ultimately about altering behavior of humans, studies based on social sciences — on how they might be designed, implemented, and enforced on a collective basis — are essential." The paper has been accepted for publication in 2005 in the journal *Marine Policy*. For a pre-publication copy of the paper, e-mail p.j.jones@ucl.ac.uk, or write Peter Jones, Environment & Society Research Unit (ESRU), Dept. of Geography, UCL, Remax House, 31-32 Alfred Place, London WC1E 7DP UK. Tel +44 20 7679 5284.

Book provides guide to cetacean MPAs

A new book examines how MPAs can help protect cetaceans — whales, dolphins, and porpoises — and, to an extent, how the presence of cetaceans can be used to aid MPA planning and management. Detailing the status, process, and potential for cetacean habitat conservation, the book cites steps for creating better protected areas for cetaceans. It also describes habitat needs for 84 species and lists more than 500 MPAs that have been designated or proposed to protect cetaceans worldwide.

"The biggest threats to cetaceans are degradation of critical habitats, overfishing and bycatch, and marine pollution," says author Erich Hoyt, senior research fellow at the Whale and Dolphin Conservation Society, a UK-based NGO. "The threat best addressed by MPAs is degradation of critical habitat for feeding, breeding, and other social activities." Hoyt writes that critical habitat for cetaceans is a fairly new idea and is yet to be fully explored, much less implemented. Identifying the critical habitat of cetaceans will be the first step toward good marine management of MPAs for cetaceans, he says. Because marine habitat boundaries (such as hunting and feeding areas) may be relatively fluid due to changing oceanographic conditions, he argues for MPA networks and flexible MPAs, with regular adjustments of boundaries as needed.

To achieve this level of adaptive habitat management, says Hoyt, it will be necessary to incorporate ecosystem-based management in the MPAs. To that end, the presence of cetaceans can serve as an ecological monitor for the overall health of the marine environment. Disturbances in the food chain caused by overfishing or environmental changes, for example, can affect cetacean distribution markedly. Hoyt adds that the popularity of cetaceans can help increase community support for an MPA and educate locals to the impacts of their activities on the animals and their habitat.

The 512-page *Marine Protected Areas for Whales, Dolphins, and Porpoises: A World Handbook for Cetacean*

Habitat Conservation is listed at £24.95 (US\$39.95) but may be purchased at discount through the publisher Earthscan at <http://www.earthscan.co.uk>, or through online booksellers including www.phinz.com (which offers a free poster of cetacean MPAs with book purchase).

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Marine reserves and MPA networks can help reduce poverty, says study

NGOs need to improve their use of conservation activities to reduce poverty wherever possible, including by establishing marine reserves and MPA networks, according to a study by The Nature Conservancy, a US-based NGO. "Making fisheries more sustainable is generally good for both poverty reduction and biodiversity conservation," the authors write. "One of the best tools for sustainable fisheries is marine protected areas with zones in which all extractive activities are prohibited." The study cautions, however, against expecting biodiversity conservation to reduce poverty in all cases. "Biodiversity conservation's utility for poverty reduction should not be overstated," it says. "The two are complementary so long as they are specifically targeted at areas where the known preconditions for success exist." The study, "Direct Benefits to Poor People from Biodiversity Conservation" is available online in PDF format at <http://www.conserveonline.org/2004/11/c/en/LayoutA4Screen1.pdf>.

Report: More than half of world's corals reefs endangered

Over 58% of the world's tropical and temperate coral reefs are endangered due to an array of human impacts, including sedimentation, land-based pollution, overfishing, and climate change. This is according to the 580-page, 2004 edition of *Status of Coral Reefs of the World*, released by the Global Coral Reef Monitoring Network (GCRMN), a partnership of governments, institutes, and NGOs from more than 80 countries. The report provides an update on the previous edition, released in 1994.

In addition to reviewing trends in reef status by region, the report reviews progress in coral reef monitoring and status since 1994, as well as progress in monitoring coral-reef MPAs. For the first time, it also assesses the status of cold-water, or deep-sea, coral reefs around the world. The report is available online at <http://www.aims.gov.au/pages/research/coral-bleaching/scr2004/index.html>.

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