

## Seismic Surveys and MPAs: How Should Managers Address the Issue of Underwater Noise?

There has always been natural “noise” in the sea. Undersea volcanoes, for example, can produce extremely loud sounds — intense enough, hypothetically, to kill a man at close range (if the boiling water and lava did not get him first). The low-frequency vocalizations of some whale species are intense enough to travel 10,000 miles.

But over the past 150 years, the noise levels in our oceans have increased significantly. This is due to human activity. The propeller noise from shipping has raised the baseline for low-frequency ambient ocean sound worldwide. There is noise produced by undersea construction, such as pile-driving (e.g., hammering posts into the seafloor, such as for docks or drilling platforms). Sonar is used to map the ocean bottom or (for naval defense purposes) to scan for submarines. And airguns are used in seismic surveying: exploring the geologic substructure of the seafloor by sending sound energy into the ground and analyzing the returned energy.

What is the impact of this added noise on sea life? Because sound dissipates with distance, a loud sudden noise experienced by a fish or marine mammal will have a greater effect at close range than far away. The noise from pile-driving, for example, can be loud enough to stun fish nearby, but may have little (or less) effect on marine life several kilometers away. That said, marine mammals, because they are so dependent on sound to communicate, may be particularly sensitive. The effect of “masking”, for example — when rising background noise interferes with the ability of individuals to hear or be heard — can block a range of signals among members of a species, such as signals to help identify mates, communicate the presence of food sources, or warn of the presence of predators.

This article focuses primarily on seismic surveying. Because the offshore petroleum industry is actively seeking new sources of oil and gas, and conducts seismic surveying to explore for sub-sea hydrocarbon reserves, MPAs are increasingly encountering the possibility of such surveying inside their boundaries or in nearby waters. *MPA News* has received letters from MPA managers in recent years seeking advice on what intensity of seismic surveying can be considered safe for

marine life. Here we describe a recent case that involved seismic surveying inside an MPA, and examine what managers in general can do to reduce the potential for negative impacts.

### Impacts of sound

In very broad terms, seismic surveying works under the same general principle as sonar or even echolocation (used by dolphins and whales to detect prey). An energy source sends pulses of sound outward, which then travel through the water column or the seafloor. Some of the sound waves refract (bend) or reflect off surfaces, and a receiver detects the returning sound. By noting patterns in the returned sound, it is possible to estimate properties of the surface(s) that reflected or refracted it — whether the surface is the seafloor, a subsurface oil deposit, a magma chamber beneath an undersea volcano, or a school of fish swimming around (in the case of dolphin echolocation).

Aside from those similarities, however, there are some big differences. Seismic surveying, which uses a ship-towed array of multiple airguns as its sound source, relies mainly on low-frequency sound waves of 100 hertz or less. In contrast, the high-pitched “pings” produced during a multibeam sonar survey usually have peak levels in the tens to hundreds of kilohertz.

The difference in frequency plays a role in how each system affects the environment, says Leila Hatch, marine ecologist at Stellwagen Bank National Marine Sanctuary in the US. Although all sound diminishes with distance, she says, low-frequency sounds diminish more slowly, meaning their impact can last over longer distances than those of high-frequency sounds. “Energy at low frequencies can travel great distances,” says Hatch. “Thus, there can be a larger potential range of impact to organisms whose hearing is tuned to lower frequencies, or who use low frequencies to communicate, including many of the large baleen whales.” Potential impacts of noise on sea life range according to the intensity of the sound. At lower intensities, or at greater distance from the sound source, organisms may simply exhibit avoidance behavior (although, with enough noise, they

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may also be impacted by masking of signals, as described earlier). At higher intensities, there can be temporary or permanent hearing loss. At ultra-high intensity, there can be organ hemorrhaging and death. In some cases, intense naval low-frequency active sonar (<1000 Hz) has been accused of playing a role in the stranding of marine mammals, particularly beaked whales. (See, for example, the 2006 *Journal of Cetacean Research and Management* article “Understanding the impacts of anthropogenic sound on beaked whales” at [www.saplonline.org/oceans/Noise/IONC/Docs/Coxetal\\_2006.pdf](http://www.saplonline.org/oceans/Noise/IONC/Docs/Coxetal_2006.pdf)).

To manage such impacts, some countries have established standards to govern the deployment of acoustic tools. The standards are based on *received* sound levels rather than the sound levels *at source*. The US National Marine Fisheries Service, for instance, has set a standard that the received sound level for impulsive signals — such as those produced by airguns in

seismic surveying — should be no more than 180 decibels (dB) for cetaceans and 190 dB for pinnipeds. Above these levels, there is risk of permanent hearing damage and other physical injury, depending on the sensitivity of the species. To comply with these standards, seismic survey programs and multibeam sonar operations are required to take steps to reduce levels of exposure for marine mammals when possible. When that is not possible, operators must ensure that the number of marine mammals exposed is small and impacts to overall populations is negligible (among other requirements). There are multiple mitigation and monitoring measures (see box to the left) that can be taken to help ensure the standards are met.

John Ford, a marine mammal biologist with Canada’s Department of Fisheries and Oceans (DFO), says more research is needed to fine-

tune the standards by the type of sound (e.g., low- or high-frequency) and the species to be protected. “These are recognized as crude standards,” he says.

[Editor’s note: For historical reasons, sound in water is referenced to a different intensity than sound in air. As a rough technique for converting sound levels from water to air, subtract 62 dB from the sound level in water: i.e., a 190-dB sound underwater would be approximately equivalent to 128 dB in air. See [www.fas.org/man/dod-101/sys/ship/acoustics.htm](http://www.fas.org/man/dod-101/sys/ship/acoustics.htm).]

### The Endeavour case

In 2008, a team of researchers from US universities informed the Canadian government that it was interested in conducting a seismic survey inside the Endeavour Hydrothermal Vents Marine Protected Area, off the Pacific coast of Canada. The 93-km<sup>2</sup> MPA was designated in 2003 to protect fields of deep-sea hydrothermal vents and their associated biological communities on the seafloor. Although most marine seismic surveying is conducted to search for oil and gas, this survey would be different. The purpose was to study the structure and longevity of the volcanic heat source that drives hydrothermal activity at the site, as well as the plate tectonics of the region. Knowledge generated by the survey could benefit understanding and management of the MPA, and also provide insights on volcanic and earthquake-related hazards to the Pacific Northwest region of the US and Canada.

In consultation with the Canadian government ahead of time, the research team agreed to mitigation measures that were more conservative than common Canadian practice to that point. The scientists expanded the marine mammal safety zone around the ship to a radius of 1220 meters, at which distance the received sound level would be 180 dB. (If a whale were spotted within the safety zone, the array would be powered down until the whale left the zone.) Also, a pre-startup watch period was expanded from 30 minutes to 60 minutes as a safeguard against any deep-diving whales’ being in the safety zone.

In August 2009, a week before the expedition was to start, two Canadian conservation NGOs filed a lawsuit against the government to disallow the study. The lawsuit argued that noise from the surveying would harm marine mammals at the site (blue whales and fin whales sometimes live in the area) and thus did not comply with Canadian law to protect endangered species. They also argued that MPAs, in particular, deserved to be governed under the precautionary principle: that any possibility of harm to the ecosystem should be avoided when possible. This was not the first MPA to encounter this argument. In 2003, the government of the Australian state of Victoria refused an application for seismic surveying inside the Twelve

### Strategies to reduce impact of seismic surveying on marine mammals

- **Avoid surveying in areas with sensitive species:** gather data on how animals use an area prior to conducting seismic surveys there
- **Safety zone around the survey:** make this zone large enough to ensure that received sound levels outside of it are below a maximum limit
- **Pre-shoot watch:** look for marine mammals inside the safety zone prior to starting the airguns
- **Visual observers:** look for marine mammals inside the safety zone during the survey, and power-down the seismic activity if marine mammals are sighted
- **Passive acoustic monitoring:** listen for vocalizing marine mammals
- **Soft-start or ramp-up:** gradually build up the airgun sound level to allow marine mammals to depart the area before sound levels peak
- **Minimize airgun sound propagation:** use the lowest practicable volume throughout the survey
- **Restrict airgun use during nighttime hours:** conduct surveys only when there is sufficient light for marine mammal observations

*Source:* Adapted by *MPA News* from Weir *et al.*, “Marine mammal mitigation during seismic surveys and recommendations for worldwide standard mitigation guidance”. Published by the Whale and Dolphin Conservation Society, UK. [www.ketosecology.co.uk/MitigationSC58E12Final.pdf](http://www.ketosecology.co.uk/MitigationSC58E12Final.pdf)

Apostles Marine National Park. The Victorian environment minister said at the time, “A higher environmental test applies to national parks and we have adopted a precautionary approach in this case.”

In response to the Endeavour lawsuit, DFO’s Ford proposed that the radius of the safety zone around the vessel be expanded to 7 km: the goal would be to reduce received sound to a maximum of 160 dB outside the zone. (A threshold of 160 dB is believed by some marine mammal researchers to be the point above which behavioral disturbance can occur.) The research team consented to Ford’s recommended change, and increased its number of marine mammal observers in order to monitor the larger radius. Ultimately a Canadian court ruled that the environmental NGOs had failed to prove that the survey would cause “irreparable harm”; therefore, the court could not halt the survey. The expedition proceeded in September. (Notably, a marine seismic survey that was proposed in 2007 for the fjords of northwest British Columbia, Canada, was disallowed by the government in part because an adequately large safety zone was not possible in such confined waters, says Ford.)

William Wilcock, a marine geophysicist at the University of Washington in the US, served as co-investigator on the Endeavour survey expedition. He says the threat to marine mammals was negligible, as blue and fin whales would not typically be in the Endeavour region during the time of year of the survey. In an essay written with his Endeavour co-investigators (Doug Toomey and Emilie Hooft), Wilcock said, “During the 16 days of seismic data collection, no whales were observed by the marine mammal observers. But had they been, the mitigation measures that were in place before the legal action would have been more than sufficient to ensure that they were not harmed.” (The essay is available at [http://gore.ocean.washington.edu/research/etomo\\_environmentalists\\_091809.pdf](http://gore.ocean.washington.edu/research/etomo_environmentalists_091809.pdf).)

Wilcock believes the legal challenge by environmentalists was part of a strategy by them to prohibit any seismic surveying off the Pacific coast of Canada, for fear that it might open the door to oil and gas surveys in the region. There is currently no hydrocarbon exploration off Canada’s Pacific coast, in contrast to the country’s Arctic and Atlantic waters where exploration has been permitted. Wilcock says the fact the government required stricter mitigation for the Endeavour survey could lead to later legal problems for the government. “In future court actions, how will the government explain the discrepancy between the mitigation measures required for the Endeavour study and the less onerous ones used elsewhere in regions where marine mammal encounters are much more likely?” he asks.

Sabine Jessen of the Canadian Parks and Wilderness Society (CPAWS) — which, along with the Living

Oceans Society, had filed suit to stop the Endeavour survey — is disappointed the study was allowed to proceed, but is pleased that safety was improved. “We hope our challenge resulted in improved monitoring of marine mammals,” says Jessen. “CPAWS’ motivation was to protect the Endeavour Vents MPA, and other Marine Protected Areas in Canada, from harmful disturbances that we believe to be illegal.”

She says scientists need to take responsibility for ensuring they use the best available technology to minimize risks to the natural environment. Moreover, she says, it is government’s responsibility to apply the precautionary approach. “Government must ensure that potentially harmful scientific experiments are not permitted on the basis of a lack of full scientific certainty of the likelihood or magnitude of harmful impacts,” she says. She adds this is particularly the case for MPAs. “Acoustic disturbance of MPAs should be limited to the greatest degree possible.” She suggests MPAs should be managed to provide “acoustic comfort” to their resident species.

### Advice for managers

Wilcock and his co-investigators say there have been no clear cases yet where seismic experiments have injured or killed marine mammals. “Provided that seismic experiments are performed with sensible mitigation measures (e.g., marine mammal observers; ramping up the sound source over time), the only impact on marine mammals is that some avoid the sound source,” they wrote in their Endeavour essay. However, if the time and place of a seismic experiment coincide with an important marine mammal feeding or birthing ground, they add, it would be advisable to change the season or location of the experiment. If such changes are not possible, they say, “then the [resource] managers must make a difficult determination of whether the societal benefits of the research at a particular site outweigh the impacts on the environment.” (Wilcock, Toomey, and Hooft emphasize the benefits of their Endeavour research and point out that commercial ships regularly pass through the MPA there producing significant propeller noise and the threat of whale strikes.)

DFO’s Ford considers a maximum of 160 dB for received sound to be “the best standard we have” for guarding against negative impacts to cetaceans, notwithstanding the uncertainties involved in gauging marine mammal sensitivity. He adds, however, that the range at which that level is reached — and hence the size of the safety zone — can vary with the type of survey, depth, and other factors. Therefore a preset safety zone at an arbitrary distance may be overly large for some surveys, and not large enough for others.

Hatch of the Stellwagen Bank National Marine Sanctuary says MPA managers should educate them-

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*MPA News* is published bimonthly by Marine Affairs Research and Education (MARE), a 501(c)(3) not-for-profit corporation, in association with the School of Marine Affairs at the University of Washington.

Financial support for *MPA News* is provided in part by a grant from the David and Lucile Packard Foundation.

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selves on current governmental guidelines for safe practices. "The best tools for reducing risk of injury are to produce less sound within frequencies that affect marine mammal hearing and communication, and to operate outside time periods and areas where marine mammals are present," says Hatch. "The MPA manager should engage the surveyor in dialogue on how best to reduce or eliminate impacts. That includes providing information to the survey team on the distribution, densities, and behavior of species in the MPA that could be impacted. In areas where such information is lacking, best practice would dictate gathering baseline data prior to conducting seismic surveys there." 

## On Balancing Science and Conservation in an MPA: A Case from Eastern Canada

Scientific research can be invaluable for effective MPAs. It helps managers understand the ecosystems they oversee, and can observe how those ecosystems respond to management and environmental changes.

Not all research techniques are the same, obviously. For every method that is non-invasive (such as reef surveys by divers), there are techniques that impose a greater impact on the environment. Seismic testing, as described in the previous article, is one example. Trawl surveys, a traditional fisheries science technique, can be another, particularly in areas with sensitive seafloor habitats.

The challenge arises for managers: how to balance the need for science with the need for conservation in cases where there is conflict between the two? A case in eastern Canada illustrates how one management authority has attempted to strike the balance.

### The Gully MPA

Trawl surveys have been a routine part of fisheries stock assessment on the east coast of Canada for four decades. The Canadian Department of Fisheries and Oceans (DFO) uses an automated system to select random points to sample on the country's continental shelf. Some of those random points have fallen within the boundaries of a protected site: the Gully Marine Protected Area, designated in 2004 and managed by DFO to protect a large and biodiverse marine canyon.

The Gully MPA carries general prohibitions against "disturbance, damage, destruction, or removal" of organisms or habitats within the MPA. But it also allows limited fishing for some species in certain zones.

### For more on underwater noise:

- **Overview of the impacts of anthropogenic underwater sound in the marine environment** (2009, OSPAR). [www.ospar.org/documents/dbase/publications/p00441\\_Noise%20Background%20document.pdf](http://www.ospar.org/documents/dbase/publications/p00441_Noise%20Background%20document.pdf)
- **Maritime traffic effects on biodiversity in the Mediterranean Sea, volume 1: Review of impacts, priority areas and mitigation measures** (2009, IUCN). <http://data.iucn.org/dbtw-wpd/edocs/2008-042-1.pdf>
- **"The impacts of anthropogenic ocean noise on cetaceans and implications for management"** (2007, *Canadian Journal of Zoology*). [http://article.pubs.nrc-cnrc.gc.ca/ppv/RPViewDoc?\\_handler\\_=HandleInitialGet&journal=cjz&volume=85&calyLang=eng&articleFile=z07-101.pdf](http://article.pubs.nrc-cnrc.gc.ca/ppv/RPViewDoc?_handler_=HandleInitialGet&journal=cjz&volume=85&calyLang=eng&articleFile=z07-101.pdf)

In other words, the random trawl surveys would not be the only incidents of organisms being removed from the ecosystem. However, some of the trawl surveys' random sample points happened to coincide with areas of fragile habitat — centuries-old deepwater coral. There was conflict: one arm of DFO sought to conduct its standard research on fisheries, while another arm (management of the MPA) sought to protect habitat. DFO was already sensitive to the potential for negative public relations from this. In 2002, video of a DFO trawl survey off the east coast showed the unintentional hauling of large coral pieces. The damage revealed by the video drew media attention and public criticism.

Paul Macnab, manager of the Gully MPA, describes the process that has been put in place to manage the science/conservation conflict. "When the MPA regulations were passed into law in 2004, the survey proponents were newly required to obtain Ministerial approval for the conduct of a scientific activity in the MPA," says Macnab. "Since then, each sampling station selected for the Gully has been assessed against prior sampling records, geological seabed classifications, and ecological data (e.g., coral) where and when available. For deeper stations on glacially relic or structurally complex bottoms where it was likely there would be negative interactions with coral — namely, contact with the trawl gear leading to impacts like removal, damage, or destruction of the coral — some applications have been denied. Stations proposed for shallower depths on sandy substrate where natural variability is high (e.g., sediment moved by storms and waves), and where there may have been significant trawling effort in the past, have mostly been approved."

Recently, DFO fisheries scientists withdrew the Gully MPA from their survey design until greater certainty on sites within the MPA could be obtained. Gully management and the scientists are in talks now about the possibility of proactively assessing and agreeing on which portions of the MPA may be sampled safely in the future, rather than relying on one-off applications that may or may not be approved on a case-by-case basis.

### “The MPA management paradox”

Macnab calls the balancing of science and conservation “the MPA management paradox”. “We need to study, assess, and monitor populations, age, abundance, closure effects, diversity, and so on — but we also need to protect the same,” he says. He says non-invasive methods are great when available, but cannot tell management everything it needs to know. Optical survey technology is evolving quickly, he says, but tissue samples are still necessary for genetic studies (such as for examining source-sink dynamics), for fatty acid or stable

isotope analyses (which can provide information on diet), and for contaminant monitoring.

Notably, the regulations for the Gully allow for researchers to disturb, damage, destroy, or remove organisms and habitat in the MPA *if* the learning will contribute to MPA understanding and management. Drawing that line can be tricky, says Macnab. “We want our science colleagues to be out there doing their part in the MPA even if it means some risk of damage and disturbance,” he says. But he also wants to see MPA-specific programming, analysis, and follow-up on the scientists’ part — not simply a pre-existing science plan designed for other purposes and applied to the MPA in a cookie-cutter way. “We want to see targeted monitoring and more site-level, hypothesis-driven science,” he says.

The website for the Gully MPA is [www.mar.dfo-mpo.gc.ca/oceans/e/essim/gully/essim-gully-e.html](http://www.mar.dfo-mpo.gc.ca/oceans/e/essim/gully/essim-gully-e.html). 

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## New Initiative Guides Protection of Significant Areas in Open Ocean, Deep Sea

An international scientific partnership has been launched to help nations identify significant areas in the open ocean and deep sea that need protection. Facilitated by IUCN with support from the German Federal Agency for Nature Conservation, the Global Ocean Biodiversity Initiative (GOBI) will apply the best available science to analyze areas according to criteria adopted by the Convention on Biological Diversity in 2008. The criteria include ecological considerations such as uniqueness, vulnerability, diversity, productivity, importance to life history stages, and more.

Partners in the initiative include the Census of Marine Life, the Ocean Biogeographic Information System, Duke University’s Marine Geospatial Ecology Lab, the UNEP-World Conservation Monitoring Center, the Marine Conservation Biology Institute, the University of Freiburg (Germany), Birdlife International, and individual collaborators from several countries.

The September-October 2009 issue of *MPA News* described challenges involved in identifying significant areas in the deep ocean — an ecosystem that remains perhaps the least-known place on Earth (*MPA News* 11:2). GOBI was launched in September at a workshop of the Convention on Biological Diversity planned specifically to address those challenges. Kristina Gjerde, acting coordinator of GOBI, says the workshop was a success. “The workshop developed practical and user-friendly guidance with respect to 1) the identification of marine areas beyond national jurisdiction in need of

protection, building on lessons learned from the wealth of national and regional experience described at the workshop; and 2) the use and further development of biogeographic classification systems to help develop representative MPA networks on the high seas,” says Gjerde.

A background document developed for the CBD workshop by GOBI, “Defining ecologically or biologically significant areas in the open ocean and deep sea: Analyses, tools, resources and illustrations”, is available on the workshop website at [www.cbd.int/marine/documents.shtml](http://www.cbd.int/marine/documents.shtml), and on the GOBI website at <http://openoceansdeepseas.org>.

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### CCAMLR designates first high seas MPA in Antarctic waters

The international body that governs living resource management in Antarctic waters has designated a 94,000-km<sup>2</sup> marine protected area in waters south of the South Orkney Islands. The Commission for Conservation of Antarctic Marine Living resources (CCAMLR) approved a UK proposal for the MPA’s designation in early November. No fishing and no discharge or refuse disposal from fishing vessels will be allowed in the area.

The goal of the MPA is to allow scientists to better monitor the effects of human activities and climate change on the Southern Ocean. Phil Trathan and Susie Grant of the British Antarctic Survey, who led the scientific work in planning the South Orkneys MPA, called it “the first link in a network that will better conserve marine biodiversity in the Antarctic.” It is the first high seas MPA in Antarctic waters, and will enter into force in May 2010.

# New Coordinator of World Heritage Marine Programme Describes Plan Forward

The new coordinator of the UNESCO World Heritage Marine Programme says the World Heritage Convention has “not been applied anywhere close to its full potential for marine ecosystems.” Today, there are just 35 World Heritage sites — out of a total of nearly 900 worldwide — that have been identified and protected specifically for their marine values. The lack of coverage of marine sites has not been helped by the fact that funding for the Marine Programme dried up three years ago, leaving it without oversight.

Now, however, a new funding partnership has helped renew the program and offers possibilities it has not had before. Fanny Douvere, the new coordinator for Marine World Heritage, says the program is well-positioned now to develop and carry out a solid strategy, including designation of new marine sites, strengthening of management capacity for existing sites, and better outreach. “I believe we can substantially enhance ocean protection through the World Heritage Convention and simultaneously improve the management of places already listed,” says Douvere. The Convention, adopted in 1972 by UNESCO, seeks to protect the world’s most important natural and cultural heritage.

## “Tides of Time”

The new three-year funding partnership, called “Tides of Time”, involves a luxury watchmaker and a newspaper. “The objective of the partnership among the Swiss watch manufacturer Jaeger-LeCoultre, the International Herald Tribune, and the World Heritage Centre is to increase protection of marine World Heritage sites,” says Douvere. The partnership provides both annual financial support and communication coverage for the

World Heritage Marine Programme. The private companies gain from association with some of the most beautiful ocean places in the world. “The partnership provides benefits for all three partners,” says Douvere.

Now it is up to the Marine Programme to take advantage of the opportunities the partnership provides, says Douvere. Her strategy has three goals:

- (1) Strengthen the credibility of the World Heritage List through support for nominations in marine areas that are currently under- or unrepresented (i.e., in the Middle East, Caribbean, and Indian Ocean) and through global studies, in cooperation with IUCN and others, that assess marine ecosystem types currently not protected under the World Heritage Convention;
- (2) Strengthen capacity-building and conservation efforts through initiatives to improve the exchange of good practices among site managers; and
- (3) Strengthen communication and outreach — including to society as a whole — of the potential of the World Heritage Convention to improve marine conservation and help toward achieving various international conservation targets.

“Achieving these goals will be challenging, but not impossible,” says Douvere. She says it will require expanding the cooperation already existing among national governments, international organizations and their regional offices, NGOs and their networks, and universities that support the Marine Programme’s mission. The Marine Programme website is <http://whc.unesco.org/en/marine-programme>. 

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## Notes & News

### UK launches consultation on MPA around Chagos Archipelago

The UK government has launched a consultation on designating an MPA around the Chagos Archipelago in the Indian Ocean. The archipelago, also called the British Indian Ocean Territory (BIOT), has an Exclusive Economic Zone of 636,000 km<sup>2</sup>. The consultation seeks views on whether the BIOT should become an MPA and what regulations would be appropriate, such as whether it should be completely no-take. The archipelago lies about 500 km due south of the Maldives, its nearest neighbor.

UK Foreign Secretary David Miliband said, “This is a remarkable opportunity for Britain to create one of the

world’s largest marine protected areas, and to double the global coverage of the world’s oceans that benefit from full protection.” Information on the consultation is at <http://ukinseychelles.fco.gov.uk/resources/en/pdf/mpa-consultation-document>.

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### Mozambique forms transboundary MPA with South African site

The East African nation of Mozambique has designated a 678-km<sup>2</sup> MPA — the Ponta do Ouro Marine Reserve — along the southernmost part of its coast, adjacent to the nation’s boundary with South Africa. There, the newly designated site forms a transboundary protected

area with South Africa's existing iSimangaliso Wetland Park, a UNESCO-listed World Heritage Site that abuts the border from the other side. Mozambique has nominated Ponta do Ouro for consideration to be added to the World Heritage list as well. Together, the two sites form the largest MPA in Africa, according to iSimangaliso CEO Andrew Zaloumis.

A transfrontier task team, consisting of relevant agencies from both countries, is coordinating oversight of their shared resources. Jointly, the protected areas comprise important habitat for turtles, dugong, marine mammals, and migratory birds. Activities such as commercial fishing, fishing on coral reefs, and fishing with explosives are banned in both protected areas.

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### Sweden and Norway designate adjacent MPAs

In September, Sweden and Norway designated side-by-side marine national parks to protect a deep marine trench that crosses the countries' shared ocean boundary. The marine national parks of Kosterhavet (Sweden) and Ytre Hvaler (Norway) cover a total area of 800 km<sup>2</sup> in the Skagerrak Strait. Two hundred meters deep, the trench contains over 6000 marine species, including corals and marine mammals.

The ecosystem supports an important inshore fishery for prawns and lobster, while the nearby coast is a major tourism destination for both countries. The new MPAs aim to ensure sustainable use of the environment and are the first marine national parks for either nation. An OSPAR press release on the new parks is at [www.ospar.org/content/news\\_detail.asp?menu=00600725000000\\_000007\\_000000](http://www.ospar.org/content/news_detail.asp?menu=00600725000000_000007_000000).

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### Resort company helps designate MPA in Jamaica; has plans for more through Caribbean

Sandals Resorts International, which operates 22 coastal resorts throughout the Caribbean under the *Sandals* and *Beaches* brand names, has partnered with the Jamaican government to designate a no-take marine reserve in waters adjacent to the Beaches Boscobel resort. The MPA, called the Boscobel Fish Sanctuary, is roughly 1 km<sup>2</sup> in area. It will be patrolled by the resort's water sports crew, which will include a warden. The goals of the MPA are to curb damage to coral reefs from fishing and restore marine life populations.

Fishing is the only activity banned in the sanctuary; the site will remain open to snorkeling and other resort activities. Previously there was trap fishing and

spearfishing in the area by local fishers, says Heidi Clarke of Sandals Foundation, the philanthropic arm of Sandals Resorts. "The idea will be to work with the fishermen and the community to educate them as to the importance of this area," says Clarke. Sandals Foundation aims to help designate similar no-take areas at each of its resorts. More information on the new sanctuary is at [www.sandalsfoundation.org/newsEvents/NewMarineSanctuary.cfm](http://www.sandalsfoundation.org/newsEvents/NewMarineSanctuary.cfm).

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### Palau declares EEZ a shark sanctuary

Palau has designated its 620,000-km<sup>2</sup> Exclusive Economic Zone as a shark sanctuary, banning the commercial fishing of sharks in Palauan waters. It is the first nation to outlaw shark fishing entirely. President Johnson Toribiong, who announced the designation of the sanctuary in a speech to the UN General Assembly, invited other world leaders to follow suit, saying many shark species are at the brink of extinction due to shark finning. Globally, 32% of pelagic shark and ray species are threatened with extinction, according to the IUCN Shark Specialist Group. President Toribiong also called for a global ban on shark finning. For a copy of President Toribiong's announcement, visit Shark Talk (a blog dedicated to championing the idea of a Palauan shark sanctuary) at <http://sharksanctuary.blogspot.com>.

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### Consultation to identify an Area of Interest off Nova Scotia

In October, Canada's Department of Fisheries and Oceans (DFO) initiated a public consultation to identify an Area of Interest for a future MPA in waters off the province of Nova Scotia. DFO proposed three marine sites off eastern Nova Scotia as candidates for public comment. Based in part on the feedback, DFO will recommend one site to the Minister of Fisheries and Oceans for announcement as an Area of Interest.

Selecting an Area of Interest is the first step in establishing a statutory Marine Protected Area under Canada's *Oceans Act*. Once selected, the Area of Interest will undergo detailed evaluation, research, and public consultation before a Marine Protected Area is designated. Canada has committed to establishing a network of protected areas in its marine waters, including a goal of designating six new Marine Protected Areas across the country by 2012. More information on the consultation is at [www.dfo-mpo.gc.ca/media/npres-communique/2009/mar15-eng.htm](http://www.dfo-mpo.gc.ca/media/npres-communique/2009/mar15-eng.htm).

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### "Human chain" along MPA boundary aims to raise awareness

On 16 September, a chain of more than 1000 students, teachers, and community members linked hands along the 1236-meter shoreward boundary of the Whangarei

### New tool available for analyzing protected areas in Pacific Canada

A new online tool is available to help analyze the characteristics of current marine protected areas off the coast of Pacific Canada. Called the MPnA Decision Support Tool, it allows users to produce detailed reports and statistics on the social, cultural, and ecological values of more than 180 protected sites. It was produced through a partnership between Fisheries and Oceans Canada and the provincial government of British Columbia. Roughly 2.8% of Pacific Canada's marine waters are under protected area status, as well as 28% of the British Columbian coastline. The tool is available at <https://apps.gov.bc.ca/pub/mpna/home.do>.

## **Coral and sponge closures off Newfoundland**

In September, the Northwest Atlantic Fisheries Organization (NAFO) closed 11 areas of coldwater sponge and coral habitat to bottom fishing. The closures, which cover a total area of more than 8500 km<sup>2</sup>, are in international waters more than 200 nm off the Atlantic coast of Canada. "This action reconfirms NAFO's commitment to protect vulnerable marine habitats and species," said the organization in a press release. NAFO has now closed a total of 12 significant coral and sponge locations and five seamount areas to bottom fishing. The organization is an intergovernmental fisheries science and management body, and has 12 contracting parties from North America, Europe, Asia, and the Caribbean. The NAFO press release on the closures is at [www.nafo.int/about/frames/media.html](http://www.nafo.int/about/frames/media.html).

Harbour Marine Reserve in New Zealand to celebrate the MPA's third anniversary since designation. The event also aimed to raise awareness of the site, and particularly its boundaries. Since 2006, there have been 37 prosecutions for illegal activity in the no-take reserve, which comprises less than 3% of Whangarei Harbour. Organizers of the human chain hoped the event would help educate the community on what areas were off-limits to fishing. Several boats assembled to mark the seaward boundary of the MPA. The event was organized by the Experiencing Marine Reserves program of the Mountains to Sea Conservation Trust, supported by the NZ Department of Conservation.

The MPA was first proposed by students of nearby Kamo High School in 1990, and formally designated by the NZ government in October 2006. It covers 2.4 km<sup>2</sup> and includes rocky reef and intertidal habitats. More information on the human chain event is at [www.emr.org.nz](http://www.emr.org.nz).

## **Compensation program approved for fishermen affected by Papahānaumokuākea MPA**

The US National Marine Fisheries Service has instituted a final rule on how it will compensate eligible and interested fishing-permit holders who have been displaced by fishery closures associated with the 362,000-km<sup>2</sup> Papahānaumokuākea Marine National Monument. The compensation program is open to holders of lobster permits and bottomfish permits. The final rule is the same as a draft version released for comment in April 2009 (*MPA News* 10:10).

Commercial fishing is minimal in the Northwestern Hawaiian Islands, where the MPA is located. There are just eight remaining permit holders for bottomfish, and the lobster fishery has been closed by federal fishery managers since 2000 — six years before the MPA was designated — due to low lobster populations and potential impacts of the fishery on endangered monk seals.

Fishing for lobster in the MPA will remain off-limits, while fishing for commercial bottomfish and associated pelagic species will be prohibited after 15 June 2011. Permit holders who voluntarily accept compensation under the rule must immediately surrender their permits and leave the fisheries. By buying up permits from existing permit-holders, the compensation plan intends to speed up the phaseout of fishing. The compensation rule is at <http://edocket.access.gpo.gov/2009/E9-22181.htm>.

## **US advisory committee delivers guidance on evaluating national MPA system**

The US Marine Protected Areas Federal Advisory Committee (MPA FAC) has developed and recommended a planning tool for evaluating the effectiveness

of the national system of MPAs. The tool evaluates context, planning, inputs, processes, outputs, and outcomes of the national MPA system, and is based on a framework produced by IUCN in 2000 (i.e., *Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas*). Information on the recommended tool is available at <http://mpa.gov/mpafac/fac.html>.

## **Queensland releases coral stress response plan**

The government of the Australian state of Queensland has released a plan that allows for application of temporary fishing bans in cases when coral reefs are severely stressed. Designed to aid coral recovery after stressful events, the Coral Stress Response Plan applies to two fisheries in particular — live coral and marine aquarium fish. Both fisheries operate on the Great Barrier Reef off the Queensland coast.

Queensland Fisheries Minister Tim Mulherin said freshwater runoff and elevated sea surface temperatures were usually the cause of coral stress for Queensland reefs. "At these times, the Coral Stress Response Plan aims to promote recovery by reducing any further stress that may result from harvesting coral and aquarium fish," said Mulherin.

The plan allows for a range of management actions. In cases of low stress, for example, there might be no changes to coral and aquarium fish collection practices. However, for extreme coral stress events, no commercial harvesting of any corals or aquarium fish in the impacted region will be permitted. Development of the plan was a collaborative effort among industry, fishery managers, and the Great Barrier Reef Marine Park Authority. The Coral Stress Response Plan is available at [www2.dpi.qld.gov.au/extra/pdf/fishweb/Coral-stress-response-plan-for-the-coral-and-marine-aquarium-fish-fisheries.pdf](http://www2.dpi.qld.gov.au/extra/pdf/fishweb/Coral-stress-response-plan-for-the-coral-and-marine-aquarium-fish-fisheries.pdf).

## **WCPA and Sylvia Earle write letters to world leaders on marine protection**

In October, underwater explorer Sylvia Earle and the Marine Programme of the World Commission on Protected Areas (WCPA – Marine) partnered to send personalized letters to leaders of more than 100 coastal nations, inviting them to join together in protecting and restoring the world's oceans with MPAs. The letters cited commitments already made by nations — through the Convention on Biological Diversity and the 2003 Johannesburg Summit on Sustainable Development — to designate networks of MPAs. The letters also cited Earle's receipt of the 2009 TED (Technology, Entertainment and Design) Award, which grants awardees a "wish to change the world". Her wish was for industry to help build public support for a global network of MPAs, or "hope spots" as Earle calls them. A press release on the letters is at <http://blog.protectplanetoocean.org/2009/10/sylvia-earle-and-iucn-invite-world.html>.