



Conserving Habitats that Are Poorly Understood: Deepwater Corals and Efforts to Protect Them

Many parts of the ocean remain largely unknown to scientists. The deeper the water, the more difficult and costly it is to study the ecosystems there. Sometimes it is only exploration by commercial interests that sheds much light on the deep ocean, as the petroleum and fishing sectors plumb ever-greater depths with advanced drilling and fishing gear.

Such has been the case for deepwater corals. Although naturalists have known since the 1800s that some corals live in deep, cold water, researchers are only beginning to appreciate the scale of their reef communities, and their potential ecological significance to fish and biodiversity. As the petroleum and fishing industries increasingly encounter these reef communities off the coasts of Europe and elsewhere, resource managers are starting to consider necessary protection. This month, MPA News examines the current state of knowledge on deepwater corals, and the various efforts to protect them.

So much still to learn

It may surprise the layperson that some of the world's largest coral reefs, stretching several kilometers in length, exist in the northeast Atlantic, off the coasts of Norway and British Isles. There are records from the past century of fishing boats dredging up tons of coral from single trawls off Ireland. Existing deepwater corals in fished areas are remnants of what were likely much larger reefs.

The predominant coral species in the northeast Atlantic – the hard, branching *Lophelia pertusa* – prefers cold temperatures, thriving in waters between 4-12°C. Unlike tropical corals, deepwater species hold no symbiotic relationship with photosynthesizing algae in order to survive; researchers believe they get their nutrients from filtered plankton or, perhaps, from seafloor hydrocarbon seeps. With no need for light, deepwater corals typically live between 100 and 2000 meters below the surface. They grow slowly – living for hundreds of years – and have been found in oceans around the world.

In the limited amount of research done to date on deepwater corals, more than 800 species of marine organisms – including 23 species of fish – have been

recorded living on or in *Lophelia* reefs in the northeast Atlantic.

For scientists, the questions remaining on deepwater corals include ones as basic as documenting where they exist. André Freiwald of the University of Tuebingen (Germany) is coordinating the European Union-funded Atlantic Coral Ecosystem Study (ACES), the largest study of deepwater corals to date. The five-year project, now halfway done, will provide a baseline assessment of deepwater corals in the northeast Atlantic, and offer recommendations for future monitoring and management. To perform its research, the project is using submarines, robotic devices, and other high-tech tools.

“Conducting a large-scale assessment of a complex ecosystem on the high seas with a highly multidisciplinary team bears a broad suite of risks that can easily cause a major delay,” said Freiwald. Nonetheless, ACES remains on schedule. By 2003, it will produce detailed maps on dimension, internal structure, and existing physical damage (such as from trawl activity). It will also produce data on oceanographic conditions that favor reefs, and a fuller species inventory. Lastly, the study will assign “sensitivity codes” to each reef area suggesting which sites might be most easily damaged by commercial exploitation in the area.

Recommending where to site MPAs

Anthony Grehan of the National University of Ireland is leading the policy side of ACES. He anticipates that the project will recommend designation of MPAs for some deepwater corals, and notes that the UK is already moving forward along this line. “The UK has agreed to declare the Darwin Mounds – a UK offshore area where corals are being damaged by trawlers – as the first offshore Special Area of Conservation under the European Union’s Habitats Directive,” he said. [Text of the Habitats Directive is at http://europa.eu.int/eur-lex/en/lif/dat/1992/en_392L0043.html.] In Ireland, an Irish Coral Task Force was set up last year to investigate allegations of trawl damage, and is now also working with ACES to protect reefs.

Website for ACES

The project website for the Atlantic Coral Ecosystem Study (ACES) is <http://www.uni-tuebingen.de/geo/gpi/ag-freiwald/proj/aces>.

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Deepwater corals

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Where does this leave the fishing and petroleum industries? Trawlers may be most negatively affected by MPAs, particularly in the short term. Long-line fishermen, says Grehan, may benefit if they are allowed to continue fishing in coral areas. "Corals are an important source of structural complexity," he said. As such, he suggests, it is possible that the reefs serve as spawning areas for some species or provide refuge for juveniles of commercially important fish. In that case, by protecting the reefs, MPAs would theoretically protect the fisheries, too. As for the oil and gas industry, Grehan says its involvement with ACES will provide the industry with early notice of sensitive areas, which could save the sector money in the long run.

Freiwald says that when ACES has finished in 2003, it "will only have scratched the surface" in terms of knowledge about deepwater corals. Nonetheless, the project team is confident that its northeast Atlantic-based results will be applicable to other deepwater coral ecosystems in the world's oceans. "We are in close discussion with Canadian, Australian, and New Zealand marine research groups who intend to use our experience in planning their studies of deepwater coral ecosystems," said Freiwald.

Norway first to designate cold-water coral MPA

Last year, the Norwegian Directorate of Nature Management designated a small, 0.5-km² marine reserve to protect its Tautrarygg coral reef. It was the world's first MPA to protect cold-water coral. All potentially damaging activities – including anchoring, dredging, laying of pipe, or sampling of coral or coral-affixed organisms – are now banned at the site.

Located in a fjord, the Tautrarygg reef is the shallowest *Lophelia* reef known, with parts of the reef existing only 40 meters below the surface. Popular with divers, the reef has sustained damage over the years, primarily from anchors and from scientists' gathering of coral samples.

"*Lophelia* localities within fjords are much smaller than those on the continental shelf," said Ingrid Mjølnerød, advisor to the Directorate of Nature Management. On Norway's continental shelf is the largest *Lophelia* reef known in the world – the Sula reef. It measures 13 kilometers long, about 750 meters wide, and covers nearly 1000 km². Norway's somewhat smaller Iver reef, also on the continental shelf, covers more than 620 km².

Facing fishing pressure, both reefs were closed to bottom trawling within the past two years by the national Directorate of Fisheries. Fishing in the water column above the reefs is still allowed. The Norwegian Institute of Marine Research estimates that about half of

Norway's coral reefs have been partially or completely destroyed by trawling.

Mjølnerød points out that the Sula and Iver reefs are so far protected only by fisheries legislation, not by formal MPA legislation. "We find that is most appropriate since fishing activity is the immediate threat, and we believe that fishermen are more likely to obey their 'own' legislation than ours." Her directorate continues to examine other areas for potential MPA designation. "We have finalized a list of 47 proposed marine protected areas along our coast," she said. "Several of these are coral localities, so hopefully we will have more corals protected by 2004."

The state oil company of Norway, Statoil, has played a major role in research on the country's deepwater corals. It is credited with discovering the Sula reef during an investigation of where to site pipelines along the west coast of the country. Most of the mapping done of *Lophelia* in Norwegian waters has come about through similar pipeline-related projects.

Canadian fishermen working to protect corals

On the east coast of Canada, where depleted fish stocks have depressed the region's fishing-based economy for years, two fishermen have helped lead efforts to protect the country's deepwater corals. Derek Jones and Sanford Atwood – both hook-and-line fishermen by trade – now spend their time educating the public about deepwater corals and lobbying government scientists and fishermen to stop the practices of trawling and dredging in coral areas.

"The biggest challenges to the protection of cold-water corals is the lack of accountability of government policy and the lack of public knowledge of the coral habitats," said Jones.

Jones and Atwood co-founded the Canadian Ocean Habitat Protection Society, an NGO that now operates a museum devoted to deepwater coral science and education. The museum displays specimens collected by the fishermen and provides research evidence of what they see as a link between healthy coral habitats and healthy fisheries. "Corals are the ultimate fish habitat – especially hard corals – and fishermen have acknowledged this for generations," said Jones.

He, Atwood, and a group of scientists, conservationists and longline fishermen are now championing the idea of an MPA designated in the "Hell Hole", a high-energy deepwater environment off the southern tip of Nova Scotia. The 500-km² site contains relatively undisturbed corals, and is also home to giant halibut and marine mammals. 

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MPA Perspective: Why and How MPA Planners Should Obtain Fishermen's Knowledge

By Bruce Burrows

Why should MPA planners talk to fishermen?

- The act of gathering fishermen's knowledge results in the formation of a relationship – hopefully a good one based on trust. This will help to achieve the buy-in necessary for establishment and enforcement. Buy-in is both a moral and pragmatic necessity. In a true democratic system, you can't impose measures on various groups without some effort to achieve agreement. And experience shows that if fishermen don't agree with conservation measures, such as MPAs, those measures will fail.
- Fishermen's knowledge fills data gaps – i.e., cod spawning areas, coral reefs, sponge reefs. Their information is, geographically, usually of a much finer scale than government info. And collectively it's much more complete for a given commercial species than anything government or academia can produce because fishermen spend so much more time on the water.
- If you identify and avoid high-use areas, you can avoid unnecessary battles. There's no sense going to war to protect a highly fished mud bank if there's another mud bank that isn't highly fished. That doesn't mean we have to avoid all battles, just unnecessary ones.
- If you can achieve a consensus among user groups, you can use that to lever governments. In the developed world, most MPAs have been pushed by citizen groups with fishermen following along behind – i.e., Great Barrier Reef and the dive-oriented sites in BC. But in the Third World, many no-take areas have been established at the behest of local fishermen, often led by an NGO. This could be because NGOs have developed a relationship with local people through their economic development work.

How should MPA planners talk to fishermen?

- Don't use the term "fishers".
- Explain what you're trying to do and what the benefits are for fishermen. Present the evidence for fisheries benefits resulting from MPAs.
- Be aware that "overfishing" is not the fault of fishermen but of managers, at least in a managed fishery.
- It can be very helpful if you establish a relationship based on issues other than MPAs. For example, if local fishermen are fighting to clean up pulp mill emissions and you can assist in that fight, it will give you some credibility when you want to talk about MPAs.

- Be aware of history and the mistrust fishermen have for outside bodies, government or NGOs. Urge fishermen to take control of the process.
- Never, ever sell people out. If you're going to use fishermen or First Nations [Canadian term for aboriginal people] as poster children in some environmental fight, you can't then paint them as villains every time stocks become depleted.
- Be respectful. If a fisherman says cod spawn in a certain area, don't question that information just because it doesn't agree with what some government agency says. Chances are, he's right.
- Don't use academic or bureaucratic language, but don't patronize either. It is just good practice to avoid the use of jargon and to use the local names for fish.
- Be honest. If there's potential for information to result in a negative impact on fishermen, even short-term, be upfront about it. Fishermen are used to closures and restrictions. They will accept them if they can see a potential benefit.
- Be specific about what you mean by an "MPA". You have to be clear about this because it has huge ramifications for fishermen. We use the Living Oceans Society definition, which is a core no-take area overlaid with strict habitat protection mechanisms and surrounded by a buffer area that extends the habitat protection standards.
- Try to limit "respondent burden". Don't ask everybody for everything. People have areas of expertise. Ask a few key questions and be ready for extra comments – e.g., I ask about spawning areas and former hotspots. That starts the conversation and I get all sorts of other info. But presenting every fisherman with a standardized, extensive list of questions can be off-putting and a waste of time if the questions are outside his area of expertise.
- Recognize that there are different user groups and that they have different perspectives and concerns. For example, salmon fishermen have less of a stake in MPAs than rockfish guys. Bottom draggers may be less sympathetic because they are so often portrayed as the villains. Small boat owner/operators are often "greener" because they fish close to home and can't always sail away from their excesses.
- Conclusion: I don't pretend these are hard and fast rules, or the only way to approach local information gathering, but they reflect my experience. I'd be interested in hearing comments about other people's experience and methodology. 📧

Editor's Note:

Bruce Burrows, author of the adjoining perspective piece, has worked as a commercial fisherman on the Pacific Coast of Canada for 20 years. Burrows now serves as fisheries outreach coordinator for the Living Oceans Society, a Canadian NGO, raising the awareness of fishermen on the subject of MPAs. In the following piece, he offers tips to NGOs and other MPA planners on why and how they should work with commercial fishermen. Some of his points echo comments made by Bob Johannes (p.5) in discussing the knowledge of indigenous fishermen.

The adjoining piece by Burrows is based on a presentation he made at the "MPA Power Tools Conference", White Rock, British Columbia, Canada, October 19-21, 2001.

For more information

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In most areas of the world, indigenous peoples can be important stakeholders in the planning and management of marine protected areas, often offering a detailed ecological knowledge of the sea, honed over centuries. In addition, some nations grant special territorial and resource rights to indigenous peoples, empowering them with a direct say in how protected areas are planned and managed.

This month, as Part One of a two-part study, MPA News offers insights from two experts — Gonzalo Oviedo and Bob Johannes — on issues involved in the participation of indigenous peoples in MPA practice. In next month's newsletter, we will examine case examples of MPAs in which indigenous peoples have played a significant role.

For more information

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Indigenous Peoples and MPAs: Interview with Gonzalo Oviedo of WWF

In the past decade, WWF (an international NGO) has taken a prominent role in global discussions on conservation and indigenous societies, publishing more than 40 reports, books, and other works on the subject. Gonzalo Oviedo is head of the People and Conservation Program at WWF International, which focuses on protecting cultural and biological diversity around the world. This month, MPA News spoke with Oviedo about the opportunities and challenges facing indigenous societies with regard to the practice of MPAs.

MPA NEWS: Why is it important for MPA practitioners to involve indigenous people in the planning and management of protected areas?

OVIDEO: It is important to involve them because it helps these communities to maintain or achieve sustainability in their practices, which in turn leads to compliance with the management objectives of the protected areas.

When MPAs are established, it is generally because of the perception of environmental threats, which are also threats to traditional cultures and practices. So involving traditional communities is a way to protect their traditional practices and ensure that they continue to be attuned to, or get back on track with, the natural functioning of their areas. At the same time, by involving traditional communities, management may be enriched by traditional knowledge. [See Johannes, next page.]

MPA NEWS: In your view, do the cultural practices of an indigenous people – developed over perhaps hundreds or thousands of years – inherently possess more value than the practices of a non-indigenous people, whose practices in some cases may be just decades old (or less)?

OVIDEO: The cultural practices of indigenous peoples generally possess more “conservation value” than those of non-indigenous peoples. But from there it doesn't follow that all traditional practices of all traditional peoples are better than any non-traditional practices of non-traditional communities. Perhaps that sounds obvious, but many advocates of the “ecological indian” model seem to think that way.

Now, it also has to be put into context. In the past, Fijian traditional communities used to use *duva* – a poison root that makes for an easy harvest but kills all small fish and corals together with larger target fish. Indigenous communities in Ecuador would use *barbasco* – basically the same thing. These practices were not ecologically good in themselves, but in the context of limited pressure over resources, low population density

and little competition with other users, they would not have dramatic effects. Now that the context has changed, these practices have become unsustainable and have to be stopped – in Fiji, communities decided by themselves to stop it.

So context is a key issue, because sustainability in the end relates basically to carrying capacity, and this has fundamentally changed in the modern world for many traditional societies.

MPA NEWS: What are the biggest challenges facing indigenous communities with regard to achieving effective participation in government-led processes to protect natural resources?

OVIDEO: There is a great diversity of challenges in this regard, but I'd say they consist mainly of three types: political challenges, capacity-related challenges, and those that pertain to cultural change.

Political challenges refer to the fact that governments still have many problems in understanding fundamental issues surrounding traditional use rights, traditional management, and traditional institutions, *vis-à-vis* the existing protected-area laws, policies, and practices. There is still a lot to do in this respect, including, of course, the fundamental issue of territorial and resource rights. But “political” also refers to the fact that indigenous and traditional peoples have many problems in understanding how their rights can be implemented in the current political conditions (e.g., where nation states will not give up sovereignty) and thus everything generally has to go through complex political negotiations.

The second challenge regards the capacity for negotiation, management, monitoring, and sound innovation. Sustainable, useful involvement in the management of MPAs by traditional communities is possible only through cultures and practices of synthesis, and this requires a completely new (for traditional societies) practice of learning, combining systems, and trying innovation.

The third challenge regards management of cultural change, especially transmission of traditional knowledge and practices to younger generations in conditions of inter-cultural contact, schooling, access to new economic activities, and so on. While cultural change is inevitable, it can overrun traditions and breaks links between generations. When that happens, there is a lot of stress for these communities, with implications for the survival of good traditional practices and, thus, for meaningful involvement in long-term protected area management. 

On the Need for the Study of Indigenous Fishers' Knowledge

By Bob Johannes

Indigenous fishers often possess unique and important knowledge about their local marine environments and its inhabitants. In areas where the same cultures have been fishing for generations, this knowledge can be encyclopedic. Fishers often know, for example, the timing and location of important and especially vulnerable life history events such as migratory and spawning aggregations, recruitment and nursery areas, or the locations of rare or endangered species.

How can we design effective boundaries for marine protected areas in developing countries in the absence of such knowledge?

For fisheries managers, for whom knowing the history of a fishery is essential for its management, the elders in these communities are often the only repositories of such information, including knowledge of once abundant species. Without such information, the biologist arriving on the scene to help is liable to assume that such species are unimportant locally and ignore them, rather than determine what depleted them and how the process might be reversed. Yet how many biologists have seriously solicited this knowledge?

For social scientists, fishers can provide knowledge of how this information is implemented in organizing their fisheries by means of formal or informal systems of resource allocation. Fishers can also teach us about human impediments to purely biological solutions to resource management problems. For example, simply passing laws against destructive practices is futile if endemic police, military or political corruption renders them ineffective – a point that has been overlooked on countless occasions by those working to improve coastal resource management in developing countries.

We can also learn from fishers whether their communities possess a basic conservation ethic. Sometimes they do, sometimes they don't. This makes a big difference in how education for conservation should be approached. Where a conservation ethic exists, the relevant concepts need to be studied and used as the foundation for local conservation education. Where they do not exist, conservation education is much harder, for it has to start from scratch.

So why has there been so little research emphasis on indigenous fishers' knowledge? Answers include:

1. Most biologists working on such coastal management projects are too busy gathering statistics, their usual stock and trade. They find asking unlettered people

about their marine biological knowledge too humbling, too unstructured and too unsuitable for statistical analysis.

2. Social scientists working in co-management projects often don't have the biological training necessary for the effective collection and application of indigenous knowledge about natural resources.

As fisheries biologist Frederick Ommaney said almost 40 years ago, the indigenous fisher "has forgotten more about how to catch fish in his waters than we shall ever know." How can we generate enthusiasm in local fishers for collaborating with us, and how can we function as plausible and useful advisors if we don't first assimilate this local knowledge, test it where practical, and integrate it with our own?

Fishers and outsiders who pursue co-management are both experts. Each group has specialized relevant knowledge that the other does not. Both must be harnessed to improve local fisheries management.

The time is thus overdue for the establishment of centers for the study of the indigenous knowledge of fishers and other coastal resource users. Their invaluable knowledge is vanishing at an accelerating rate as its possessors die and their children no longer show interest in learning it. Of 37 formal institutions established worldwide to study indigenous knowledge, none focuses on marine knowledge.

Institutions are urgently needed to train people to help stem this loss. The demand is there; graduate and post-doctoral students regularly ask me where they should go to get the training to do research in this area. (The young seem much more eager to tackle unconventional interdisciplinary projects like this than previous generations). But, sadly, I don't know what to tell them.

Such a center must be truly interdisciplinary. Social and biological science must both play important roles. Traditional ecological knowledge is best understood, and local resource management best pursued, in a cultural context. Biologists need to comprehend the implications of this for their work. Social scientists need some training in marine biology and marine resource management in order to fully appreciate the practical significance of the information they obtain. Ethical issues regarding the use of fishers' ecological knowledge need to be better defined.

For charitable institutions, universities, aid organizations and agencies concerned with environmental issues and looking for an empty niche to fill, here is one to consider. 

Bob Johannes, author of the adjoining perspective piece, is an Australia-based consultant on marine resource management issues, including the use of traditional ecological knowledge. The piece is an excerpt of material that Johannes originally posted to an online discussion forum run by UNESCO, called "Wise Coastal Practices for Sustainable Human Development".

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Dear Reader,

When MPA News was launched two years ago, the editorial board had one overarching goal: to serve the entire community of MPA stakeholders by informing them and bringing them together in discussion, debate, and understanding. This remains our goal, and the editorial board has worked to cover the range of views and knowledge held by stakeholders.

In providing such a forum, MPA News has at times been misunderstood. Because the newsletter prints the views of conservation groups — including, in last month's issue, the relatively radical Sea Shepherd Conservation Society — some individuals in the fishing industry have accused us of being a mouthpiece for these organizations. Conversely, because we've printed the views of some MPA skeptics, some conservationists have accused us of bending to anti-MPA opinion.

What we're doing is allowing everyone a chance to speak. And a chance to listen.

At a recent conference, a fishing industry representative remarked that fishermen are conservation groups' strongest potential allies on MPAs, provided they can be convinced of MPAs' effectiveness. His point: no one *wants* to see stock after stock depleted. If marine protected areas are to become an effective tool in rebuilding fish stocks, it is important that communication and knowledge flow ever more freely among all stakeholders in the field. MPA News will continue to do its part.



John B. Davis
Editor

Letter to the editor

Dear MPA News:

As a matter of general principle, the Tasmanian Fishing Industry Council is opposed to the introduction of no-take MPAs unless we can be satisfied that it is demonstrably in the best interests of our members and coastal communities. Locking up areas of marine waters around Tasmania (MPA News 3:4) is an extremely contentious issue, and we have yet to see positive evidence that proves marine reserves actually benefit the commercial fishing industry.

Tasmanian commercial fishing industry members hold licences, quota and gear allocations etc. which apply to all areas of water where fishing is allowed. If areas of productive water are to be closed to fishing as a result of the creation of a political marine reserve then we will be seeking appropriate compensation for all losses that may occur as a result.

Bob Lister, Chief Executive, Tasmanian Fishing Industry Council, P.O. Box 878, Sandy Bay, TAS 7006, Australia.
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Notes and news

The draft Convention on the Protection of Underwater Cultural Heritage was adopted on November 6 by the United Nations cultural organization UNESCO. The convention covers activities directed at sunken ships and other "traces of human existence" that have been submerged for at least 100 years (MPA News 3:3). Among parties to the convention, no activity directed at such heritage may occur without a permit. The convention will now be submitted to UNESCO member nations for ratification; if adopted by a two-thirds majority of member nations, the convention will become international law, at least for its signatories. For more information: <http://www.unesco.org/culture/legalprotection>.

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The results of MPA News's reader challenge to name the oldest marine protected area in the world (MPA News 3:3) will be published in next month's issue.

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The MPA News website (www.mpanews.org) now allows visitors to perform automated searches by keyword through back issues of the newsletter.