

## Food for thought

# Marine Protected Areas: a picture paints a thousand words

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Hall, S. J. 2001. Marine Protected Areas: a picture paints a thousand words. – ICES Journal of Marine Science, 58: 738–739.

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## Introduction

There is now little doubt that differences in benthic community structure are detectable when highly trawled areas are compared with those that are protected from trawling, or only lightly trawled (Collie *et al.*, 2000). Such differences can be found in all habitats if one looks hard enough, although it is equally clear that not all types of seabed are equally vulnerable. In view of the status of many fisheries and public concerns about the ecosystem, policy makers are now often charged with both managing fisheries more effectively and mitigating trawl impacts: in particular, they are facing increasing pressure to establish areas closed to trawling (Marine Protected Areas, MPAs). Responding to this pressure requires that the fishery manager address two fundamental issues. First, the objective for the closure must be specified: being quite clear about the underlying rationale for any policy measure is a pre-requisite for rational management. Second, the manager needs to be satisfied that the proposed measure stands a good chance of meeting the objective. For many aspects of the trawl impact and MPA debate, addressing these two issues is by no means straightforward.

## Possible objectives

First, consider possible objectives. With respect to trawling, perhaps the easiest case to argue is one based on simple conservation and ethics. We know that trawling changes benthic communities to some degree, and there is a groundswell of opinion, articulated most forcefully perhaps by conservation movements, but also held by the public at large, that trawling induced change to seabed communities is undesirable (e.g. Watling and Norse, 1998). A policy that reflects that opinion would establish places that are protected from the activity. For

convenience let us call this the “ethical conservation” justification, to distinguish it from the “functional conservation” justification, which would require some quantifiable material benefit to flow from the measure (e.g. increased fish production, or improved water quality). Unlike the functional conservation argument, accepting the ethical conservation argument, and implementing a policy to support it, requires no more than that there be a significant constituency of opinion that agrees with the measure.

While justification is easy, however, it is important to ask how much change is required before a closed area becomes desirable. It is here that more work needs to be done, because many of those who are naturally sympathetic to the ethical conservation argument have a poor appreciation of what the choice between a protected and an unprotected seabed really means in ecological terms. In contrast to the choice between, say, a pristine forest and one that has been clear-cut, the difference in ecological state between a trawled and an untrawled area is more subtle for most of the habitat where trawling is prosecuted. Moreover, most people have much more common experience of forest than of seabed. A higher degree of public education is required, therefore, to ensure that as informed a debate as possible can take place to determine whether closing an area is appropriate.

## Solutions

What is the best way to inform the debate? One option is to adopt a more systematic (scientific) use of visual images. At scientific symposia, one is more likely to see an ordination plot showing abstract differences between fished and unfished communities than photographs that illustrate the differences in ecological state. Moreover, when photographs are shown, they are selected

highlights that maximize the contrast between locations. Even among the scientific community, a more honest approach to the use of visual images is desirable. Whether showing pictures of the seabed to our colleagues or to other stakeholders, we should be confident that they are representative of the areas they depict. This demands the collection of randomly sampled still images (or video transects) from each “experimental treatment” and double blind sampling of those images by a set of (preferably independent) observers who are asked to place each image into a treatment category. The results can then be subjected to statistical test in the standard manner. In those cases, where untrawled areas are characterized by a rich epifauna, the contrast is likely to be highly significant, in which case even the casual observer would appreciate the ecological effect and the ethical conservation argument would be reinforced. In other cases, however, I suspect that even professionals will have trouble distinguishing fished and unfished areas, despite highly significant (but perhaps ecologically trivial) differences that are detectable using other approaches.

None of the above arguments should be taken to imply that only the fauna that is visible on the surface of the seabed matters. Clearly, the structure of the infaunal community is something that one would want to take into account. Nevertheless, many non-specialists who consider the effects of trawling as undesirable may imagine that allowing the activity will lead to a shift from a luxuriant garden, rich in sponges and other relatively large structural epibiota, to a degraded sandy desert. While this is certainly true in some locations, often it is not. A photographic analysis of the nature proposed above would show which alternative one might obtain in any given instance.

Undertaking such an analysis is important because it represents another formal validation of ecological

change, using a currency (visual appearance) that has much more meaning for non-specialist stakeholders. The approach is also consistent with decision-making that is justified within an ethical conservation framework.

Of course, simply taking photographs, showing them to people, seeing if they can tell the difference and asking if the nature of the difference is sufficient to justify a marine park should never provide the only criterion for decision-making. It does, however, go some way towards providing a common currency to bridge the gap between technical description of benthic systems and common understanding. In other areas of ethical conservation providing this bridge is unnecessary. Almost everyone can appreciate what a scientist means by saying, for example, that a cetacean population has declined by 50%, or that 500 turtles were caught as by-catch last year. Tell those same people that benthic biodiversity has decreased by 10% and they will assume it is bad, without any real appreciation of what that actually means. For many benthic communities, there may not be a single iconic species under threat from trawling around which the ethical conservation arguments can gather. Instead we must consider more community based characteristics, and communicate them in ways that resonate clearly with stakeholders. Visual images provide one way to do that and we should use more of them.

## References

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